FEBRUARY
1958

Excavating Engineer

founded 1905

Open pit mining of the largest known deposit of sodium borate in the free world has begun at the Boron (Calif.) mine of United States Borax & Chemical Corp. Ore is loaded by 3-yd. electric shovels as stripping equipment (shown on upper benches) continue removal of overburden. A feature article begins on page 21.

Bucyrus-Erie 71-B Marks Trend On Biggest Idaho Road Job

The use of a Bucyrus-Erie 71-B shovel indicates a new trend toward bigger equipment in northwestern highway work. This rugged machine was chosen by the prime contractors, F. H. Slate Co. and E. C. Hall Co. of Portland, Ore., to load out rock, topsoil, and gravel in mountainous terrain 10 miles east of Coeur d'Alene, Idaho.

The project is the biggest roadbuilding job ever let by the Idaho Department of highways. Running through Fourth of July Canyon, this 7.2-mile segment of the Interstate System replaces a narrow, winding road long cursed by irate drivers. It's the first four-lane divided highway ever attempted in such mountainous country. Some 1,700,000 yards of excavation are involved.

In digging this tough material, the contractors profited from the 71-B's dependability. They saw it maintain a good pace in areas where other machines wouldn't have stood up. Full air control, not just air assist, on all operating clutches and steering and digging brakes provided full-feel control . . . reduced operator fatigue.

In addition to the 71-B, Bucyrus-Erie Company offers a complete line of excavators from $\frac{3}{8}$ to 4 cubic yards. All machines are convertible to crane, clamshell, or dragline front ends. Machines up to $2\frac{1}{2}$ yards are also convertible in the field to hoe front end. Get all the facts on these machines from your nearby Bucyrus-Erie distributor today.

458E58C

A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

Hercules Presents

"BLASTING VIBRATIONS ...Cause and Effect"

For the first time, a scientific 16-mm. color movie is available to industrial explosives users to help explain the facts about vibrations from blasting.

The narrator is Dr. L. Don Leet, professor of geology at Harvard University and seismologist in charge of the university's seismograph station, and one of the world's foremost authorities on blasting vibrations. His scholarly but understandable approach to blasting vibrations convincingly demonstrates how the effect of a blast is often less than that of a passing truck, slamming a door, or just walking across a floor.

Perhaps this half-hour educational movie can help you in your community. Prints are available for showing to civic groups and other public gatherings. To borrow a print simply contact your nearest Hercules office.

Explosives Department

HERCULES POWDER COMPANY

900 Market Street, Wilmington 99, Delaware

Birmingham • Chicago • Duluth • Hazleton • Joplin • Los Angeles • New York • Pittsburgh • Salt Lake City • San Francisco

"WILL OUTPERFORM ANY MACHINE IN ITS CLASS!"

This Cat-built Traxcavator is loading out soil from spoil heap for grade fill and shoulders — loads out 10-yd. trucks, servicing 5 trucks with a 2-mile haul. Handling damp hard-pan, the husky No. 977 operates in 2nd and 3rd speeds and loads 10 yd. in 2½ min., averaging up to 2,000 yd. per 10-hr. day. The Minnesota State Highway job is 5.4 miles long and it calls for an excavation of 840,000 yd. of all classifications.

That's the way Mr. Markham of the E. Markham Construction Co., St. Paul, Minnesota, feels about his Cat No. 977 Traxcavator, shown loading out soil for grade fill and shoulders on a state highway improvement job in St. Paul.

Owner Markham feels that CAT-built equipment is the "most reliable and best mechanically." He says, "Caterpillar Tractor Co. has wisely shown an understanding of the contractors' equipment needs —no fancy do-dads that look good on paper and flop in operation—just down-to-earth improvements that really work."

Dependable, versatile performance is typical of Caterpillar's line of Traxcavators, from the rugged No. 977 to its tough, agile smaller brother, the No. 933. These finely balanced work units are engineered for the *hard* work, with welded steel frames, lift arms and cross braces of strong, box-section construction, and tilt arms of solid steel. They're easy to handle with quick-acting hydraulic controls.

The 50 HP No. 933, as well as the larger No. 955 and No. 977, are available in the new Series E, with extra-sturdy undercarriage for applications which put the greatest stress on your equipment. And the new side dump bucket can be had for the No. 955 and No. 933 Traxcavators. For complete details, see your Caterpillar Dealer. He'll be glad to talk your kind of language in a deal for the best in earthmoving equipment. And he'll back you up on expert service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

A NEW DIMENSION IN LOADER VERSATILITY

Advertisers

IN THIS ISSUE

American Hoist & Derrick Co., Crosby-Laughlin Div. 43
Aveling-Barford, Ltd. 51
Bucyrus-Erie Co. 2nd Cover, 12, 46–47, 53, 56, 64
Business Publications Audit of Circulation, Inc. 4
Caterpillar Tractor Co. 2, 9, 14–15, 45, 59, 4th Cover
Crosby-Laughlin Div., American Hoist & Derrick Co. 43
Drake-Williams Mount 62
Eimco Corp., The 3rd Cover
Euclid Div., General Motors Corp. 6–7
For Sale (Classified) 70–71, 72
Foster, L. B. & Co. 71
General Motors Corp., Euclid Div. 6–7
Hendrix Mfg. Co. 16
Hercules Powder Co. 1
Hough Co., Frank G. 36–37
Ingersoll-Rand Co. 49
Inorganic Chemicals Div., Monsanto Chemical Co. 13
International Harvester Co. 17, 18–19
Kiesler, Jos. F. Co. 69
LeTourneau-Westinghouse Co. 61, 63, 65
Mack Trucks, Inc. 10–11
Manitowoc Engineering Corp. 8
Marion Power Shovel Co. 67
Monsanto Chemical Co., Inorganic Chemicals Div. 13
Northwest Engineering Co. 5
Owen Bucket Co., The 55
Rogers Bros. Corp. 68
Sauerman Bros., Inc. 50
Wix Corp. 20

Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

CONTENTS

Volume 52 No. 2 **February 1958**

Borax Production Jumps at Mojave Desert Mine—by Ray Day 21
Underground mining operation in storied borax country is converted to open pit to match market demands of an exciting new age. New method will recover 100% of the ore deposit.

Hinman Builds Vermont's First Interstate Highway 28
Main feature of 5.88 mile job near Brattleboro is 161,000 yards of tough ledge rock.

Dam and Lock Rise in Rugged Hills 34
Hildebrand contractors contend with bad weather, mountainous country and cramped quarters to build structures on Monongahela River. Crawler cranes handle concrete pours.

Simple Care for Tractor Cooling Systems—by V. A. Woodling 41
A diesel engine's overheated cooling system can mean profit-losing down time. Here are some basic suggestions to keep cooling systems in your earthmovers in good working order.

News from the Field 44
Texas A. & M. Runs Operators' School 44
Pipe Pre-Assembly Saves Time 44
Improvise Street Ripper 48
Beavers Honor Nine 48
Seaway, Power Projects Report Progress 48

Equipment You Ought to Know About 52
Not in the Contract 58
Ex-Laffs Page 60
New Trade Literature 68
Notes from the Manufacturers 72

Copyright 1958 by Bucyrus-Erie Company.

Published monthly at South Milwaukee, Wisconsin, U.S.A. Single copy price, 35 cents. Regular subscription (payable in advance) $3.50 a year; Canada and foreign, subject to publication policy, $5.00 per year. Special subscription: Upon written request on company letterhead this publication will be sent free of charge to companies, executives and supervisors engaged actively in excavating. Occupation of subscriber must be given for all subscriptions, paid or special. Right is reserved to refuse foreign subscriptions. Indexed by Engineering Index, Inc. Volumes available on microfilm.

H. A. BURKHARDT, Manager
M. B. JAEGER, Publisher
W. C. VAN DYKE, Sales Manager
W. E. WILLIAMS, Editor
D. L. FOELKER, Assistant Editor
E. W. ARNDT, Art Editor
ANITA SIEVERT, Circulation
H. LINDQUIST, Staff Photographer

Circulation of Excavating Engineer is audited by Business Publications Audit of Circulation, Inc. BPA

Everybody profits ...because

you belong

in this picture!

The publisher of this magazine is often asked what kind of a man you are . . . and how many like you are receiving his magazine.

Why is he asked?

Because the *advertisers* (whose money is his chief income) insist upon knowing the types of people (by industry or profession, by title) for whom the magazine is edited — and how many are getting it.

In order to standardize on the presentation of such information to advertisers and to have its accuracy vouched for by a disinterested third party, nearly 450 publishers have joined some 200 leading advertisers and advertising agencies in a non-profit organization called Business Publications Audit.

The purpose of BPA is to assure advertisers . . . by frequently checking and rechecking . . . that each member publisher is indeed distributing his magazine, in the *numbers* promised, to the *types* of men he promised would receive it.

The BPA symbol in this magazine means that *you belong* . . . that because of your occupational interests you are qualified, in the eyes of the advertisers, to receive it.

The advertiser can thus tell whether he's getting his money's worth.

The publisher has a better sales story to prospective advertisers because his magazine is "audited."

And you, the reader, get more value from the magazine because both the advertisers and editors, knowing what your special occupation is and what your interests are, are better able to prepare advertising and editorial material that will be most informative and useful to you.

What you can do

Publishers and advertisers frequently write to magazine readers to learn what kind of articles and advertisements appeal most. Cooperate with them — will you? — by answering their questions . . . in the interest of better communications between makers and markets.

BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.

420 Lexington Avenue New York 17, N. Y.

BPA

A NON-PROFIT, TRIPARTITE MEMBERSHIP CORPORATION OF ADVERTISERS, ADVERTISING AGENCIES AND BUSINESS PUBLICATIONS

ALWAYS READY TO GO!

THERE IS NO MORE VALUABLE QUALITY IN SHOVEL OR CRANE EQUIPMENT!

No other single advantage of Northwest equipment has resulted in so many repeat orders. Your Northwest is always ready to go! *We hear it everywhere and Northwest users will tell you so.*

Northwest dependability is a direct result of Northwest design. Power is brought to the action by the most direct route. Machinery Bases and Machinery Side Frames are heat treated, cast steel to take the shocks of digging. Parts and assemblies are ruggedly built and heavy enough for the job to be done. The simple "Feather-Touch" Clutch Control brings ease of operation and is free from compressors, valves, tubing and other delicate mechanisms. The Helical Gear Drive, the Cushion Clutch, Uniform Pressure Swing Clutches not only play a part in better output but they combine in smooth, trouble-free operation to *assure performance when it is needed.* Your Northwest is *always ready to go!* There is no more valuable quality in Shovel or Crane Equipment. You can buy it in a Northwest.

NORTHWEST ENGINEERING CO.
1506 Field Bldg., 135 South LaSalle St.
Chicago 3, Illinois

NORTHWEST

Always Ready to GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

EUCLID "TWINS"

whip tough conditions on Sugden & Sivier's 1,700,000 yd. road job

Two TS-24 "Eucs" move 320 yards per hour on 3300' haul with 3% adverse grade and 16 to 20% rolling resistance

On a 1,700,000 yd. highway relocation job near Jackson, Michigan, Sugden & Sivier encountered the toughest dirt conditions in their experience. Yet, they're ahead of the earthmoving schedule—*chiefly because of the performance of their six Euclid Twin-Power Scrapers* (two 24-yd. struck capacity and four with 18 yd. struck capacity).

Water-logged sand pockets in the clay base made loading and hauling slow and difficult. In spite of the unfavorable conditions, the all-wheel drive "Twins" bulled their way through on wet, spongy, rutted haul roads . . . and averaged 1500-1600 yards per unit per 10-hour shift.

On all kinds of jobs, in every kind of dirt, on all lengths of hauls, Euclid "Twins" are outproducing other scrapers by a wide margin—the all important profit margin. More and more successful bidders are figuring their estimates on "Twin" productive capacity. See your Euclid dealer soon for additional details and proof that ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Charles T. Sugden says,
"Euclid manufactures the best earthmoving equipment available today."

"Downtime is negligible on the Twins"

That's the opinion of Mr. Sugden, a 34-year veteran in earthmoving. And, there's good reason for the high availability of "Eucs". Strength and durability are designed in and built in to every unit as a result of over 25 years of experience in building heavy construction equipment. Major components are job-proved over many years—and they're easily accessible for quick service or replacement to save downtime.

Independent hydraulic control of apron and ejector on the big "Twin" assures instant response to simple control levers . . . permits fast, controlled spreading of the load . . . eliminates expense and downtime caused by cable breakage. Interchangeable, reversible four-section cutting edge can be adjusted for best loading in various materials.

With 300 h.p. engine in the tractor and 218 h.p. behind the bowl, separate Torqmatic Drive and NoSpin differential for each drive axle, the TS-24 "Twin" cuts cycle times even under the most adverse job conditions.

Euclid "Twins" are moving the cheapest dirt!

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

From MINNESOTA to the "BIG MO"...

Manitowoc dragline digs 400,000 yards per month. Easily dismantled for major moves.

Using a Manitowoc Model 4500 dragline equipped with a 7-yd. bucket and a 100′ boom, the Luhr Construction Company of Columbia, Ill., averaged 400,000 yards of black dirt per month on a river cleanout and widening project near Beltrami, Minn. Right after this job the big Manitowoc was dismantled in only four days, shipped to Sibley, Mo., and then reassembled in less than three days. At Sibley the 4500 drag worked on a 180′ — 220′ wide, 23′ deep channel diverting a section of the Missouri River.

The big capacity Manitowoc 4500 is easy to ship and easy to assemble, making long distance moves like this both practical and profitable. By using both the mast and boom during tear-down and reassembly, the 4500 is practically a self-dismantling unit.

Despite its size, this Manitowoc is fast. Simple design and good balance contribute to fast cycles and heaped buckets. The Luhr Construction Company's machine averages two passes every minute — faster than a smaller 3-yd. rig working with the Model 4500.

There's no complicated electric motors — no restrictive trailing cable to hinder mobility. Unit drive, composed of a single diesel power package, gives you unmatched on-the-job mobility seldom found in a machine of this size. Mobility that lets you use the 4500's capacity to profitable advantage on any job.

Here's a real powerhouse with the mobility of units having much smaller capacities. Find out how the Manitowoc 4500 will fit *your* jobs. Your helpful Manitowoc distributor has all the details.

Manitowoc Engineering Corp., Manitowoc, Wis.

SHOVELS 1-5½ YD.

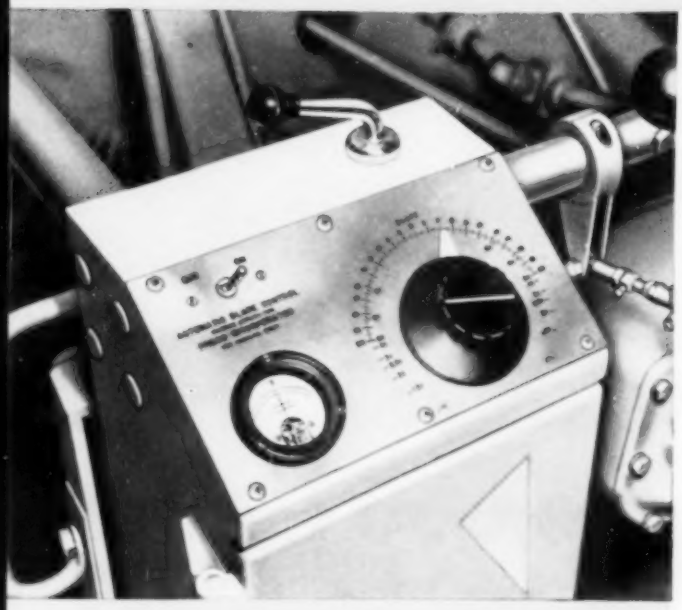
Manitowoc

CRANES 20-100 TON

JOB REPORT FROM NEVADA ON

AUTOMATIC BLADE CONTROL

–AVAILABLE ONLY FOR CAT MOTOR GRADERS!



JUST DIAL THE SLOPE ON THIS PRECO AUTOMATIC BLADE CONTROL...

...IT CONTROLS BLADE SLOPE WITHIN ⅛" IN 10', REGARDLESS OF TERRAIN!

From job after job, reports are coming in about the performance of the Preco Automatic Blade Control, a major feature introduced last year for exclusive use on Cat Motor Graders. How's it doing? Here's a typical answer from Superintendent Bill Hanson of Isbell Constr. Co., Inc., of Reno: "Work on finish is easier with the automatic control and is very accurate." His remarks are the result of work on a 9-mile, 4-lane freeway project near Carson City, Nevada. As for accuracy, controlling blade slope *within ⅛" in 10'* can be done!

More improvements for the No. 12

Though the No. 12 has earned the reputation of "standard of the industry," Caterpillar constantly looks for and finds ways to improve this machine. Automatic blade control is an example. Here are some other, even more recent improvements:

Longer main frame—a 4¾" longer main frame adds extra clearance between toe of blade and front tire for all blade positions.

Better visibility—31% more glass area in cab increases operator's visibility and efficiency.

Increased operator comfort—new seat adjusts fore and aft. Back rest adjustable, too. Cab 6" higher and cab roof insulated to reduce noise level.

Increased versatility—4" longer tandem provides plenty of clearance for chains even when machine is equipped with large 14.00-24 tires.

Have you seen the improved No. 12?

Because of these and other new features, you can count on the No. 12 for even better work—and faster. Look it over at your Caterpillar Dealer. Better still, look it over in action. Have him demonstrate a No. 12 equipped with automatic blade control. See for yourself how it steps up production!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

FOR HIGH PRODUCTION, EQUIP YOUR CAT MOTOR GRADERS WITH AUTOMATIC BLADE CONTROL

Moving 16,000 to 20,000 tons of

One of the biggest and most efficient stone-crushing plants on this continent is owned by The Highway Paving Company Limited of Montreal, which recently increased its capacity from over 400 tons per hour to over 1600 tons per hour.

Almost all of this operation is automatic. However, quadrupling production involved moving rock from quarry face to crusher in sufficient quantity to assure Highway Paving's booming operations of a continuous supply of crushed stone.

Seven Macks were given the job. Working under six-yard electric shovels, they shuttle from shovel to crusher, each making 10 trips an hour; the seven trucks average over 16,000 tons per day. The shovels really have to move to keep up with the hustling Macks, which are on the go 10 hours a day.

Highway Paving knows that its production of crushed stone is dependent on equipment that must maintain "the pace that kills", day after week after month, without crippling breakdowns. Their Macks

Mack being loaded by one of the six-yard electric shovels. The Macks take a brutal beating from the seven-ton impact of broken limestone dropped with each shovel pass . . . but come right back for more.

rock per 10 hour day with 7 trucks

have proved that they are worthy of this dependence. In fact, no other make of dump vehicle is used in this quarry.

Macks have everything it takes for dependable, profitable quarry, mine or construction hauling. Your nearest Mack representative will be glad to give you the names of Mack users in your area who are racking up new production records, with minimum down time and top economy. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK

first name for

TRUCKS

5511

Dumping rock into Highway Paving's huge crusher which is so located that trucks can dump into it from both sides. Number of loads emptied into crusher are counted electronically, and tonnage crushed is determined by belt weighing equipment.

HYDROCRANE'S 4-WAY BOOM ACTION IS BIG CONCRETE HANDLING ASSET

You can change the angle or length of the hydraulically-controlled Hydrocrane boom at the touch of a lever. These are regular boom working actions — one big reason why nothing equals the Hydrocrane for concrete handling jobs.

Erecting slabs or joists or handling a bucket, you can keep the boom point sheave directly over the load. You put the load right where you want it by changing the boom angle or length hydraulically.

There are no clutches or brakes in a Hydrocrane. Operators choose from an infinite number of speeds by metering oil in drops when necessary. Loads can be set so carefully that motion is barely visible, damage is practically eliminated.

Move these truck-mounted cranes from job to job at speeds up to 50 mph. Set up in minutes with four hydraulic, operator-controlled outriggers that remove all working stresses from the truck.

See for yourself. Arrange to have the 12-ton H-5 or the 5-ton H-3 on your job soon. Your Bucyrus-Erie Hydrocrane distributor will gladly arrange a demonstration.

179H57C

A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

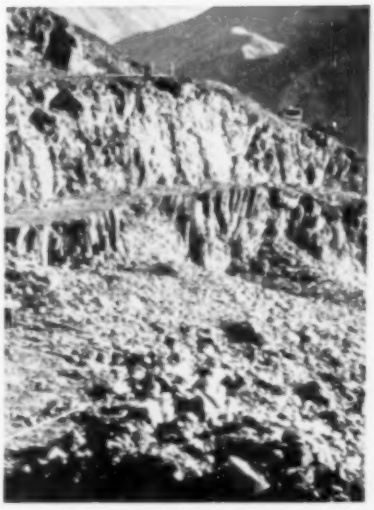
BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

NEW RESULTS OF MONSANTO RESEARCH IN USE OF AMMONIUM NITRATE AS AN EXPLOSIVE

Typical shot with Monsanto's new kind of prilled NH_4NO_3

View of area involved in the blast. Shot was made in heavy columnar basalt at dam site. Used as an explosive: a new, top-quality, prilled NH_4NO_3 that Monsanto research developed to give you optimum savings, safety, speed and ease of handling.

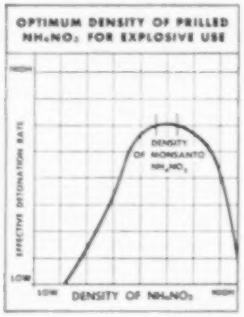
View at time of detonation. The system of detonation recommended by Monsanto, in conjunction with Monsanto Ammonium Nitrate, will yield equivalent pound-for-pound results with 60% gelatin dynamite at one-fourth the cost.

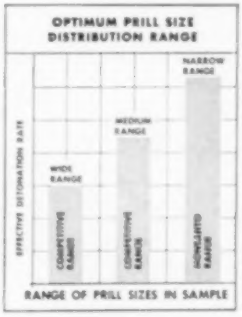


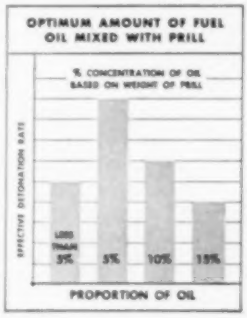
Results of blast. The powder factor in the shot above was 0.4 lbs. per cubic yard. Breakage of rock was considered ideal by contractor. Monsanto's experienced staff can give you complete technical service. Just phone Monsanto.

Photos courtesy of MORRISON-KNUDSEN COMPANY, INC.

Monsanto Ammonium Nitrate is now produced according to the specifications determined by these findings of Monsanto research. Result: more effective blast at greater savings. Monsanto is the world's largest manufacturer of prilled ammonium nitrate—and leader in developing the use of NH_4NO_3 as an explosive for open work. Request report presenting latest research findings.







CALL ST. LOUIS WYdown 3-1000 COLLECT—
OR WIRE NOW FOR COMPLETE INFORMATION

MONSANTO CHEMICAL COMPANY
Inorganic Chemicals Division
Dept. D-1, St. Louis 24, Missouri
In Canada: Monsanto Canada Ltd., Montreal

Monsanto ®

Where Creative Chemistry Works Wonders For You

All over the world, where work conditions are extra tough, you'll find dependable Cat Engines powering the job

In mud, rock, blazing heat and below-zero cold, the fine-tolerance workmanship of rugged Caterpillar® Diesel Engines keeps the job running on schedule. Wherever steady production is of prime importance, these same basic characteristics—from smooth lugging to the ability to idle for long periods—make CAT® Engines first choice for power shovels, cranes and draglines.

When Caterpillar Tractor Co. first designed its diesel, it paid special attention to durability, a trouble-free fuel injection system, and the capacity to burn a wide range of fuel. Because these features pay off on the job site, Caterpillar Diesel Engines are the keystone of the construction industry. And the fact you can count on them *not* to fail, idling down other equipment, gives these rugged power units a

Several Marion draglines, a Koehring dragline and a P&H dragline—all depend on Cat Engine power to keep the job on schedule excavating in this glacial till and sticky gumbo mud.

Shovel power is furnished by Caterpillar Diesel D375s and a D364 on construction of the Grasse River Lock on the St. Lawrence Power Project, near Massena, New York.

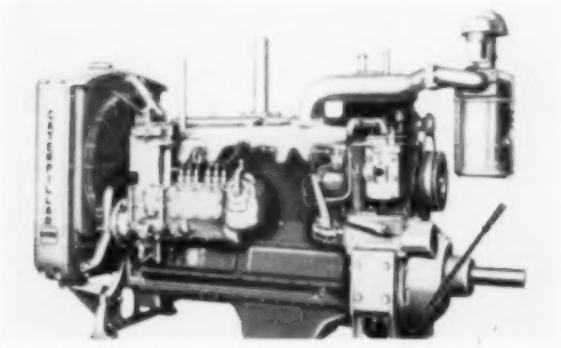
low *final* price the economy-minded spread owner can't afford to pass up.

Specify engine power by Caterpillar in your next shovel—or repower with a Cat Engine in a shovel that's working, but not hard enough. You can depend on the honest horsepower ratings of Cat Engines and their economy, durability, and sure-fire reliability. Your Caterpillar Dealer can show the right fit of power for any job, from the rugged D311 (65 HP, maximum output capacity) to the heavy-duty D397 (650 HP, maximum output capacity).

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Lorain crane, handling forms for spillway on dam construction south of Mathis, Texas, is powered by dependable Cat D337 Engine. "Like that Caterpillar equipment!" says project supt. J. A. Downey (H. B. Zachry Co.). "The rest of our equipment shows we prefer Caterpillar machines for our money when it comes to moving dirt cheaply: 26 D8s; 5 D7s; 9 D6s; 5 D4s; 1 D9; 8 DW20s; 6 DW10s."



Typical of the Caterpillar line of modern, heavy-duty diesel engines is this sturdy Cat D318 Engine. Rated at 137 HP (maximum output capacity), its four-cycle design provides a smooth, effective power stroke with an efficient utilization of power. This feature, plus Caterpillar's long life and minimum of maintenance, pay off in dependable service and profitable production.

This Bucyrus-Erie shovel, working on construction of a road to the railroad bridge being built on the Northern Pacific Railroad relocation project near Cumberland, Washington, is powered by rugged Caterpillar Diesel D318 . . . "They're dependable. We don't want any trouble so we get Cat Engines!" says the job superintendent for Hamilton-Thoms, owner.

ENGINE POWER BY CATERPILLAR

Cylinder liners typical of quality in Cat Engines Full-length, wet-type liners in all Cat Engines give more efficient heat transfer — reducing maintenance costs. Direct contact of liner and coolant means you can be sure of long liner and ring life.

Dept. EE2, Engine Division
CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Send me more information about Caterpillar Diesel Engines for prime and repowering use in the construction field. I have checked the proper box to guide your selection of material.

☐ I would like detailed information, as I may be in the market for a Cat Diesel Engine or Electric Set. I understand I am under no obligation.
☐ I am interested in learning more about these engines.

Name _____

Company _____

Address _____

City _____ Zone ___ State _____

THE BUSINESS END of any dragline...

HENDRIX
DRAGLINE BUCKETS

The bucket is the business end of any dragline machine, and it is of the utmost importance that it do the job quickly and profitably...regardless of the material being moved. HENDRIX GIVES THAT ASSURANCE!

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING COMPANY, Inc.
MANSFIELD, LOUISIANA

Hendrix Lightweight DRAGLINE BUCKETS

Doing as much as three power shovels and a dragline, this TD-18 4-In-1 dug up, and loaded, up to 1,700 feet of old concrete pavement daily—for Henry E. Berghuis, Prinsberg, Minnesota. Famous pry-action break-out makes the big difference over other rigs!

Don't let a single-action loader hold you up... see how a 4-in-1 multiplies your profit-range by four!

You've got a gun in your back two ways—with an old-style, single-action "dip-and-dump" tractor loader!

It holds you up on price, by giving you only the one machine action for your money. It hijacks profits, by sharply limiting job range and capacity.

Now, see what a contrast, in multiplied value and earning power, an International Drott 4-In-1 offers!

4-machine utility — one-machine price!

An International Drott 4-In-1 gives you four built-in, multiple-duty, big-capacity machine actions, for only a one-machine price. Your fingertip command, through the "machine-selector" lever, instantly puts any 4-In-1 action you need at your service.

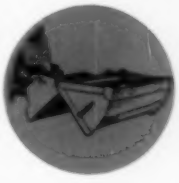
Skid-Shovel action gives you exclusive, "concrete-smashing" pry-action break-out—with famous bucket-heaping, ground-level roll-back. "Carry-type scraper" is your accurate grading, stripping, spreading, or compacting action. Clamshell action provides one-gulp "stand-and-fill" ability, plus hopper-high, self-cleanout, bottom-dumping. Bulldozer action delivers aggressive, big-yardage, earth-rolling ability.

Ease into the foam-cushioned seat—prove that your 4-In-1 investment will multiply your job-taking, money-making ability. And compare the performance protection of exclusive shock-swallowing Hydro-Spring to unprotected hose-bursting, machine-mauling "lunge-and-lift" design. Ask your International Drott Distributor to demonstrate the top buy, by far, in the construction machinery world: the 4-In-1 size that fits your needs!

Bulldozer... with clam lip up and shoes on the ground, it's a big-yardage, earth-rolling blade!

"Carry-type scraper" ...that grades, strips, or spreads with inch-close accuracy.

Skid-Shovel . . . with Drott's exclusive pry-over-shoe break-out and ground-level roll-back.



Clamshell... that fills itself in one fast gulp—gives you hopper-high, self-clean-out dumping.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

Why a TD-24 'dozes full blades *where other rigs spin and*

You don't have to jockey around, or settle for "shirt-tail" loads, or get only part-capacity performance, when you concentrate the International TD-24's full rock-slamming power—right where you want it!

You don't waste time, and fuel, and tractor life with rear-end "sluing." You don't have to "paw dirt" and then wind-up "nibbling," instead of blading out full bites. You don't lose momentum and let the blade lose part of the load every time you steer. Not with TD-24 "follow-through"!

Exclusive International Planet Power steering makes the big difference.

"Dead-track drag" is eliminated

You don't "half-kill" your power and traction to guide the TD-24, as you must with any king-size steering clutch tractor. Instead, Planet Power steering gives you full-time "live" power on both tracks while turning—or while "equalizing" to steer accurately with offset loads. And the TD-24 handles the same big loads on turns or straightaways!

Besides, the TD-24 gives you cycle-speeding, on-the-go Hi-Lo shifting. You adjust speed to the load without stopping, going forward or in reverse. You speed up the shuttle-dozing cycle, take full-time advantage of the TD-24's full capacity!

The fingers of one hand control these TD-24 performance exclusives!

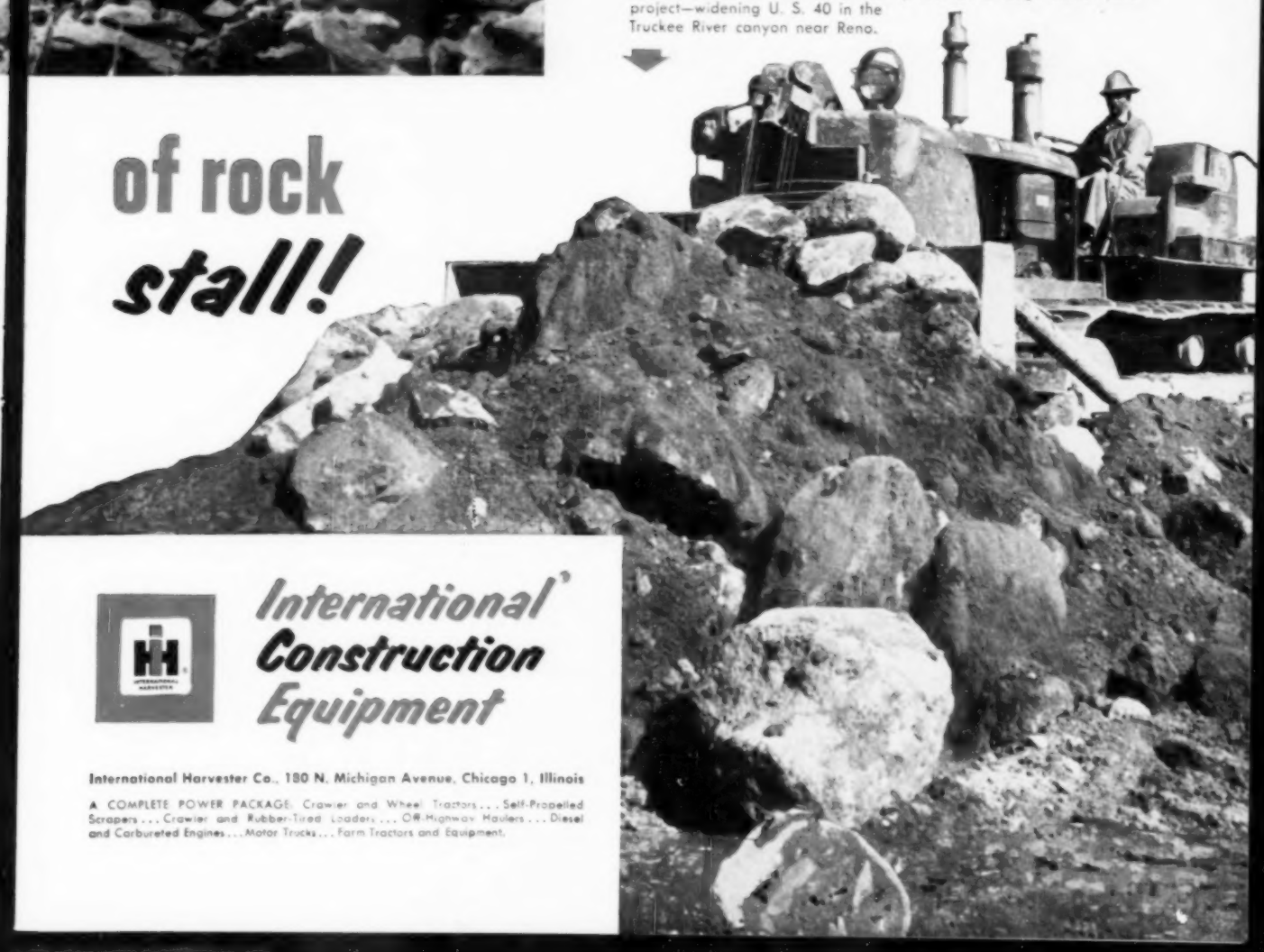
Watch a TD-24 perform—see why rock-movers call it the "rock-dozing special." Visualize how this load-control and bonus capacity make the TD-24 the ideal pusher, or outstanding for non-stop, big scraper pulling! See your International Construction Equipment Distributor for a demonstration.

Put one track in high range, the other in low—and the TD-24 pushes straight ahead, despite the tremendous offset load of benching-out unshot rock strata. P. C. Cooper, Blountsville, Tennessee, first rented this TD-24—then bought it because of its rock-'dozing performance!

An 8-unit TD-24 fleet owned by Rusciano and Sons Corp., replaced 8 big competitive crawlers—because TD-24 performance "measured up" to the toughness of this big road job. There was a considerable tonnage of granite and other rock to bulldoze—on the White Plains (N.Y.) Section of the Cross Westchester Expressway!

"With the TD-24, I can outwork any other machine where you have to push and turn with a big load," declares Operator Dan Olmstead, for Gibbons & Reed, Salt Lake City, Utah. "The TD-24 keeps the load moving, because you don't lose power braking a track." The TD-24 is spreading rock on a tough million-yard project—widening U. S. 40 in the Truckee River canyon near Reno.

# of rock *stall!*



International Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

DOES DT CAST A SHADOW OVER YOUR SPREAD?

Rx Prescription Filtration

There's a specific WIX Cartridge engineered for every engine in construction service . . . gas or Diesel — mobile or stationary — for fuel or lube oils.

CATERPILLAR
INTERNATIONAL
ALLIS CHALMERS
DETROIT DIESEL
LE TOURNEAU
EUCLID
MURPHY
and ALL OTHER Construction Equipment!

It's Down Time that Costs You Money!

Abrasive grit and dirt creeping into your motor oil is a major cause of engine failures that sideline your equipment; but WIX Filter Cartridges keep oil *clean* all the time!—don't give these contaminants a chance to get in their dirty work. You can't afford "time-out" for equipment down time!

Install WIX Cartridges in all your engines and keep your equipment on the job, on time, building your profits! WIX will make a FREE Filter Survey for you listing all your engines and showing the correct lube and oil filter replacements. Also, deliver a reserve supply of these Cartridges to your local WIX Wholesaler. One near-by source of supply for prompt, COMPLETE Oil Filter Service—no heavy inventory for you! Ask your Jobber, or write us direct, TODAY!

wix®

OIL FILTERS / AIR FILTERS
AUTOMOTIVE • INDUSTRIAL • RAILROAD
WIX CORPORATION • GASTONIA • N. C.
In Canada: Wix Accessories Corp. Ltd., Toronto

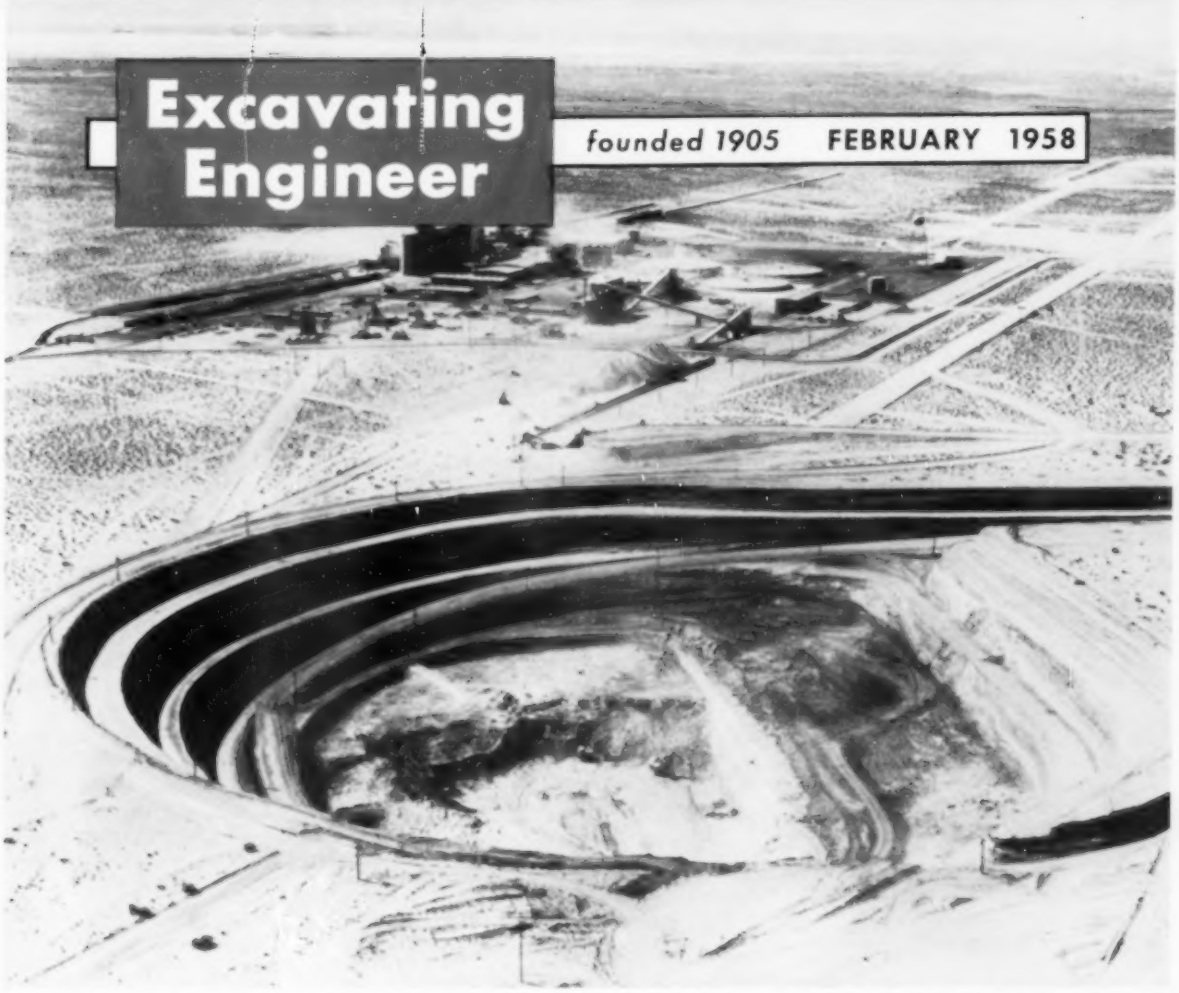
FREE

OIL FILTER SURVEY
. . . lists correct WIX replacement Cartridges for every engine; plus Inventory Control Record.

FLEET MANUAL

. . . for a continuing record of every engine. Maintenance, repair, performance—at-a-glance.

Excavating Engineer
founded 1905 FEBRUARY 1958



A deep pit gouged in the floor of the flat Mojave desert makes it possible to recover practically 100% of huge borax deposit.

by Ray Day

Borax Production Jumps At Mojave Desert Mine

Underground mining operation in storied borax country is converted to open pit to match market demands of an exciting new age. New method will recover 100% of the ore deposit.

FROM bathroom cleaner to rocket fuel in half a century is the dramatic achievement of southern California's booming borax industry.

Underground mining methods are giving way to electric power shovels, high-speed earthmoving scrapers and the latest hauling and mill processing equipment. Pacific Coast Borax Co., a division of United States Borax & Chemical Corp., has simultaneously converted its underground mining facility at Boron, Calif., into an open pit operation and has built a new $18 million processing plant to meet some of the most imaginative market demands ever faced by an American industry.

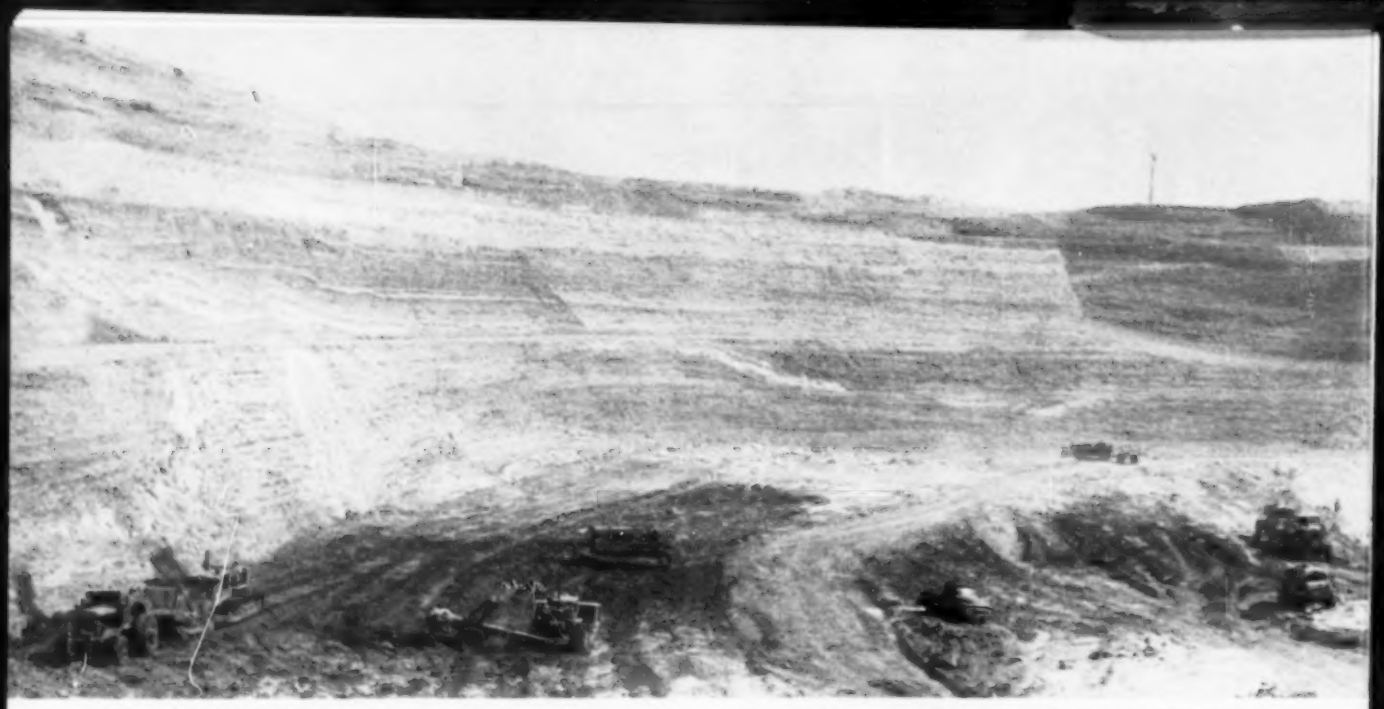
The new development is a far cry from early day surface mining, "cotton-ball" boiling, "20-Mule Team" transportation, or even the underground mining methods which modernized the mine only 10 years ago. Today's operation moves 25,000 tons of stripping daily to recover the sodium borate ore. Operations now are being firmed up for movement of that much material on a three to one stripping ratio. In less than two years a great open pit, 1,000 by 1,500 feet across at its top and 180 feet deep, has been carved into the surface of the desert 115 miles north of Los Angeles.

Increased Demand

Influencing the decision to open cut the mine were interesting market factors which promise to boost the industry's current 900,000-ton annual production to 2½ million tons by 1965. U.S. Borax & Chemical Corp., produces an estimated 70% of this tonnage. The open pit method will recover 100% of the borax deposit, rather than the 40% recovery typical of the previous room-and-pillar underground mining method.

Current uses for borax include Pyrex glass, glass fibers for insulation, plastics, porcelain enamels, welding fluxes, fertilizers, weed killers and gasoline additives.

But a whole host of entirely new and exciting uses for boron are on the



View of Isbell firm's stripping operations in early stages shows vast amount of overburden already removed by scrapers.

threshold as research laboratories work feverishly to solve the chemical problems. The development of a boron-based aircraft fuel now appears certain. Boron-based plastics resins, with melting points up to 1,000° F, are just around the corner. So are high-temperature structural ceramic compounds. Researchers believe that boron will soon be an important fire-retardant additive for plastics and paint.

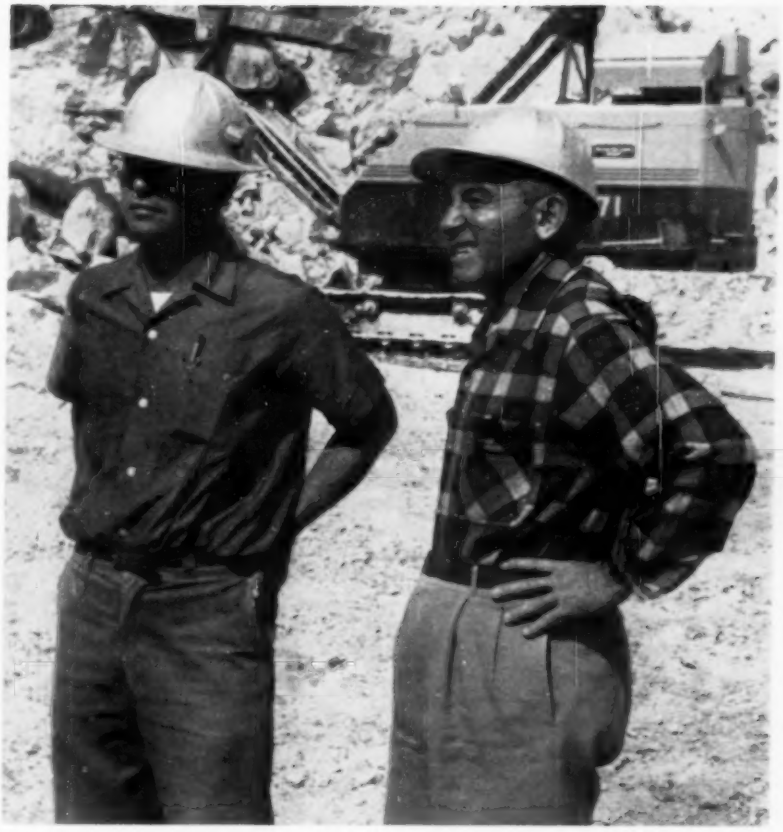
In the futuristic field, it is known that boron is being used to fuse rockets and flares, to coat the silicon wafers in Bell Laboratory's solar batteries, and —because of its peculiar tendency to absorb neutrons—the material is being used in control rods and lightweight shields for atomic reactors. Research has shown that some forms of boron can give jet fuel up to 40% more thrust. Standard Oil Co. of Ohio now has a boron additive gasoline on the market; so do Richfield Oil of southern California and DX-Sunray of Oklahoma.

Conversion of the underground mine to an open pit will boost efficiency all along the line, in addition to eliminating waste. It will reduce equipment requirements, lower the cost of maintenance and cut labor costs.

Extensive exploratory drilling indicates that the sodium borate deposit of the Boron-Kramer area is shaped like a giant desert turtle—flat on the bottom

Borax Timetable

YEAR	EVENT
2000 B.C.	Borax discovered in Gobi Desert marshes by ancient Babylonians. Used by royal goldsmiths in making rings, amulets, breastplates.
200 A.D.	Borax glazes introduced in China.
1380	Marco Polo brings first borax to Europe from Mongolia.
1640	German metallurgist Georg Agricola names borax "chrysocolla" . . . literally "gold glue."
1732	English chemist Stephen Francis Geoffroy discovers that green flame is produced when alcohol and hydrochloric acid are poured over borax and ignited.
1783	Borax discovered in Kashmir.
1850	Borax discovered in Italy.
1856	Borax discovered in California by Dr. John A. Veatch.
1872	Borax found at Columbus Marsh and Salt Wells, Nev., and at Teel's Marsh, Calif. Mining begins.
1875	Borax found in Death Valley, Calif.
1885	"20-Mule Team" hauling begins.
1890	Pacific Coast Borax Co. formed.
1898–1907	Rail transportation developed for extensive borax mining in California.
1914–'51	Extensive mining produces large percentage of world's borax.
1951	Underground mining modernized to ultimate.
1957–'58	Open pit developed, on-site processing plant built at Boron. Research for product use in plastics and fuel stepped up.
1975	????



Key personnel in pit include Biff Smith (left), assistant pit superintendent, and Pete Conte, drill superintendent.

and curved on top. Thickness of the deposit varies to several hundred feet. This particular deposit of sodium borate, which is the largest ever discovered in the free world, is called Kernite, in honor of Kern County, Calif., in which the deposit is located. It is a crystalline substance occurring in slivers.

Covering the deposit is a thick layer of overburden, ranging in depth up to 450 feet. The overburden consists of alluvial sand and gravel, tuffaceous sandstone, conglomerate, limestone and shale. The overburden is dry, with little or no ground water.

Hire Contractor

To get earthmoving under way fast, the company let a contract to Isbell Construction Co., Reno, Nev. This construction firm has earned itself a fine reputation for stripping at high speed in iron and copper mines all over the West. Isbell had the necessary equipment to move a 10 million-ton preliminary stripping block well within the two-year period it would take to construct the new processing plant. Mobilizing quickly, Isbell began stripping on January 6, 1956. Operations were carried on all that year and through 1957; since then Pacific Coast Borax Co. has taken over both the stripping and mining.

Averaging 25,000 tons per day, Isbell's work exemplified large-scale dirt moving. Since so much of the material was especially suitable for tractor equipment removal, Isbell went all-out in its use of that equipment. In the early stage of the work, three Caterpillar DW20's and four Euclid S-18 scrapers were used. This equipment was modified later to include seven Euclid TDT-12 scrapers and five new Euclid S-24's. The equipment fleet was rounded out by Caterpillar D8's and D9's for pushers and miscellaneous bulldozer work, Caterpillar No. 12 motor graders for haul road maintenance, water trucks for sprinkling, LeTourneau-Westinghouse rippers for some of the marginal hard rock, and Gardner-Denver compressors and jackhammers for drilling occasional hard spots of limestone overburden.

In developing the open pit, Isbell followed the company's general design criteria. Pit haul roads were developed from 40 to 60 feet wide, with a 7% maximum grade. Slopes on 50-ft. benches in the overburden were carved 1½ on 1 in alluvium and ¾ on 1 in soft shale. The ore benches now being developed are 30 feet in depth and are governed by normal shovel slope. The overall pit slope is 1.4 on 1. This was carefully checked during the overburden excavation by the Rhodes reducing arc method.

Excavated material moved by Isbell, was hauled out approximately one mile and used for several beneficial purposes. A large tailings area, surrounded by dikes, was created. An extensive dike system was constructed to prevent flash flooding of the open pit mine during desert torrential rains. An airstrip was built. Work was carried out on a two shifts per day basis, winter and summer, during 1956-'57.

Meanwhile, the $18 million processing plant was being constructed by the joint-venture firm of Southwest Engineering Corp., and Ford J. Twaits Co., Los Angeles. The plant covers approximately 80 acres and has been designed for future expansion if market demands justify it. Approximately 190 carloads of steel and 800 carloads of cement and aggregate went into its construction. Completion of the new plant and final development of the open pit dovetailed nicely, so that the open pit ore could be processed at the site immediately.

Completion of the open pit saved money still another way. When final pit depth was reached on top of the ore-

An 18-yd. scraper is pulled by a four-wheel Cat DW20 tractor and pushloaded by a D8 as thick overburden is removed.

body, a connecting tunnel was mucked in by underground mining equipment, connecting the underground operation with the open pit. When underground mining is abandoned in the near future, the access tunnel will allow underground equipment to be dismantled and moved out for salvage. It can be done that way much faster and cheaper than through the vertical shafts which were used for the installation of this machinery.

Pacific Coast Borax has planned an ultra-modern operation with the latest in new equipment. Scraper stripping had proved so successful for Isbell that Pacific Coast Borax has also acquired eight Euclid S-24's—powered by Cummins 300-hp turbo-charged engines—for handling the main stripping. This will consist of a gradual enlargement of the pit as benches originally established by Isbell are cut deeper and moved back.

New equipment used in the pit includes electric shovels equipped with 3-yd. dippers and special ventilating systems (a third 54-B serves as a standby machine).

Purchase Shovels

The company purchased three Bucyrus-Erie 54-B electric shovels, one of which will be available on a part-time spare basis to help out in stripping. All three shovels are equipped alike, having Westinghouse Axiflo 20,000-cfm forced-air fans and filtering systems. The shovels are supplied with power through a 4,160-volt cable and have 3-yd. dippers, although the 54-B is rated as a 2½-yd. machine. The extra capacity is justified because the average weight of material is only 80 pounds per cubic foot. This, of course, is much lighter than average rock or ore.

Since both overburden and sodium borate ore are relatively dry materials, an interesting, economical method of drilling and blasting was worked out, particularly for ore removal. Two McCarthy auger-type drills were brought in, mounted on Ford F-600 trucks.

These machines drill 4½ and 6-in. diameter holes, carrying them to a point about five feet below toe level. Considerable experimentation is still under way to determine the best hole spacing and blasting method, but it appears now that a 12 x 16-ft. grid is best for the 4½-in. hole, and a 16 x 18-ft. pattern is acceptable for 6-in. holes. The borax ore can be drilled nicely without excessive abrasion, so that one of the machines on 4½-in. work can often account for 1,000 linear feet of drilling in a single eight-hour shift.

A huge chunk of borax ore, lighter than average rock or ore, gets easily shunted aside by a dozer which is assigned to sweeping the pit floor around loading shovels.

Use of the ammonium nitrate explosives technique has worked well from the start, but is currently being modernized still further. When the material first was tried by Pacific Coast Borax, the firm used it conventionally, pouring one gallon of diesel fuel into each 100-lb. bag of the material and allowing the mixture to stand at least 24 hours before use. The material then was loaded in a column extending from the bottom of the hole to a point six feet from ground surface, so that the blast effect would carry through to the top of the material, thus eliminating secondary shooting.

To detonate the ammonium nitrate, two Hercules No. 203 primer cartridges were used, placing one of the 10-lb. cartridges close to the bottom and the other close to the top. These were connected in turn to Primacord vertical risers, and

the risers were tied to Primacord trunk lines.

An interesting local condition is the fact that a cap and fuse are used to set off the Primacord. Edwards Air Force Base is only a few miles distant, and experimental aircraft with very high-powered radar equipment overhead make cap and fuse preferable to electric blasting as a safety precaution.

Efficient as the early ammonium nitrate technique was, it is undergoing refinement currently so that it can be improved still further. At the last American Mining Congress in Salt Lake City, Utah, an official of the Monsanto Chemical Co. described a process for exploding prilled ammonium nitrate without the usual detonating charge, using only 400-grain Primacord to do the job.

In this system, 1-ft. lengths of 400-grain Primacord are spaced about three feet apart and tied to the regular detonating Primacord vertical riser line. This method is being tried, along with a full-length vertical line of 400-grain Primacord extending from the bottom to the top of the hole. According to researchers, the Primacord imparts a much higher velocity to the ammonium nitrate charge, giving an "over-drive" effect to speed up the fertilizer's explosion. This naturally results in better blasting efficiency.

Up to now, 12,000 to 15,000-ton blocks of borax ore have been pulled with good results. Some minor secondary breakage has been necessary, but it has been handled adequately by a small Le-Roi compressor and jackhammer crew.

Two of the three electric shovels work full time in ore loading; the third serves as a standby and helps out with stripping in the hard places. In setting up the electric shovels, the company spent a great deal of time, money and effort in a humanitarian gesture: training underground miners for the operating job. In that way these men, who had given the company long and loyal service, would not be displaced by the changeover to open pit operations.

The operators and oilers were strictly underground miners, and had never seen an electric shovel work before. The operator-oiler school was arranged with the cooperation of Bucyrus-Erie officials in Los Angeles, and a trained operator was hired for a two months' period to help break in the new men.

Hauling units under the 54-B's include a brand new fleet of a dozen Kenworth model 802 22-ton trucks. These trucks are powered by Cummins model NRT 300-hp diesels, equipped with turbochargers and Allison Torqmatic transmissions.

Front axles have a 25,000-lb. capacity and rear axles have a 70,000-lb. capacity. The trucks have power steering and oversize air-operated brakes.

The 802's make about a 14,000-ft. round-trip haul upgrade from the benches of the pit to the crusher and return to the pit. Elevation at which the shovels load the Kenworths is 2,250 feet and at the crusher it is 2,460 feet, for a climb of 210 feet.

Fans Control Dirt

There is ample pit room to permit double spotting of these units under the shovels, so that swing cycles can be kept down to 90°. While the loading operation is a dust generator, very little of the material reaches the inside of the shovels. Inside pressure from the Westinghouse Axiflo fans keeps dirt out. Dust picked up by the filtering system in these fans is cleaned out at least once weekly.

Pit cleanup is handled by a Caterpillar D8 tractor with a U-dozer and cab. The trucks haul their 22-ton loads over well-maintained, well-sprinkled haul

A McCarthy auger drill readily penetrates the borax ore, drilling 1,000 feet of 4½-in. hole per eight-hour shift. As the bit bores deeper, drill extensions are added.

Hauling units under the shovels are 22-ton Kenworth model 802 trucks, powered by 300-hp Cummins diesels, which make a 7,000-ft. upgrade haul from pit to crusher.

roads to the primary crusher which is situated at the start of the plant system.

Prior to construction of the new refining plant at Boron, mill operations were handled jointly by a dry-process plant at Boron—where shale or gangue was removed from the ore by high intensity induction-type Exolon magnetic separators. Reduction of part of the moisture was done by rotary driers. Anhydrous rasorite also was produced at that location in a separate plant. Other refining operations, in which refined borax and boric acid were produced, were carried on formerly at Wilmington, Calif. Conversion from underground mining to open pit, along with the new refining plant built at Boron, will combine the functions of a large portion of the present Wilmington refinery with those of the old plant at Boron.

Material passing through the refining process in the new plant goes from the end-dumped Kenworth trucks into a 44 x 66 Jeffrey flex-tooth primary crusher. This crusher, operating on the hammermill principle, will handle between 800 and 1,000 tons per hour, crushing the material to minus 4-in. size. Crushed ore from this unit is stockpiled by means of a stacker conveyor. The conveyor beds the ore in layers, thus helping to send uniform grades of material to the refinery.

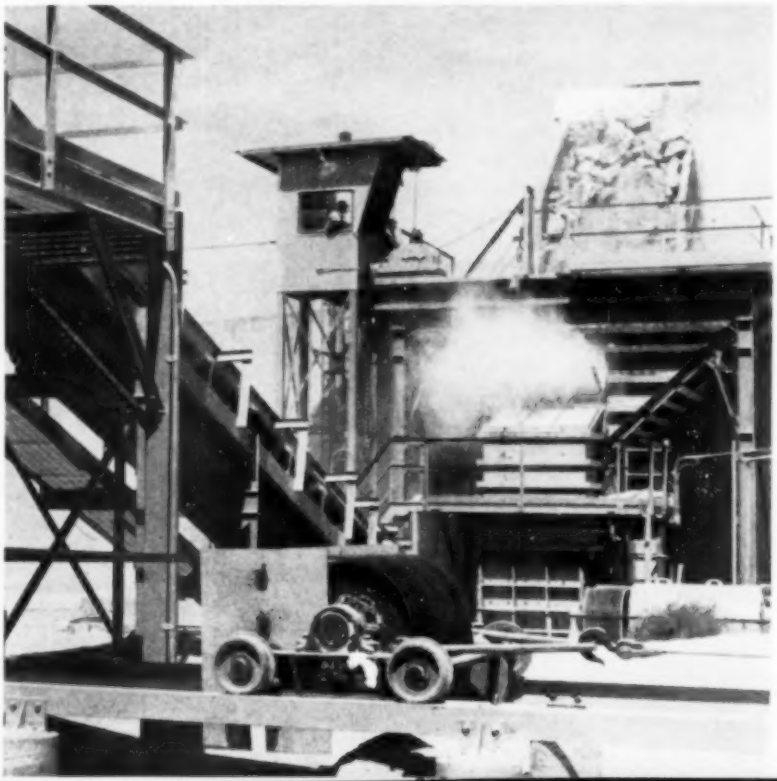
From the stockpile, the ore passes to a fine-crushing plant, where another Jeffrey unit reduces the material to minus ¼-in. The crushed ore then is stored in bins. Constant analysis is made of the ore going into these bins so that it can be further blended while being withdrawn. The draw rate from the fine crushed ore storage to the dissolving plant will then be determined by the grade of ore and production requirements.

The finely pulverized sodium borate is next sent to a series of steel-jacketed, mechanically agitated tanks containing steam coils. In this process the borate content is dissolved, while shale or gangue remains in suspension, to be removed at the next step of the process by screens or in the thickeners of the counter-current decantation plant. This plant consists of four large covered thickeners. The clay slurry is pumped from the final thickener, combined with the gangue removed at the screening process, and pumped to the tailings pond west of the plant area.

Part of the boric solution from the thickener is passed through clarification filters to vacuum crystallizers, where sodium borate decahydrate and pentahydrate is obtained. The crystallized materials are removed from the solutions by means of automatic centrifugals.

The borax, which still contains at that step a small amount of surface moisture, then is dried and stored in the large concrete silos at the south side of

Raw ore is end-dumped at the primary crusher station. A 44 x 66 Jeffrey flex-tooth crusher, operating on a hammermill principle, crushes between 800 and 1,000 tph.



the plant area. Storage of 40,000 to 50,000 tons of purified borax has been planned, principally in silos. These are approximately 90 feet high and 35 feet in diameter. There is also 20,000 tons of surge storage for raw material entering the plant, which will take care of any emergency which might develop in the pit production.

The open pit operation replaces an underground mining technique which was far from obsolete. In fact, the underground technique was modernized in 1951 at the Jenifer mine, using room-and-pillar stoping with continuous miners, shuttle cars and belt haulage. The company's Baker and West Baker mines also are in operating condition for that method, which now will be discontinued.

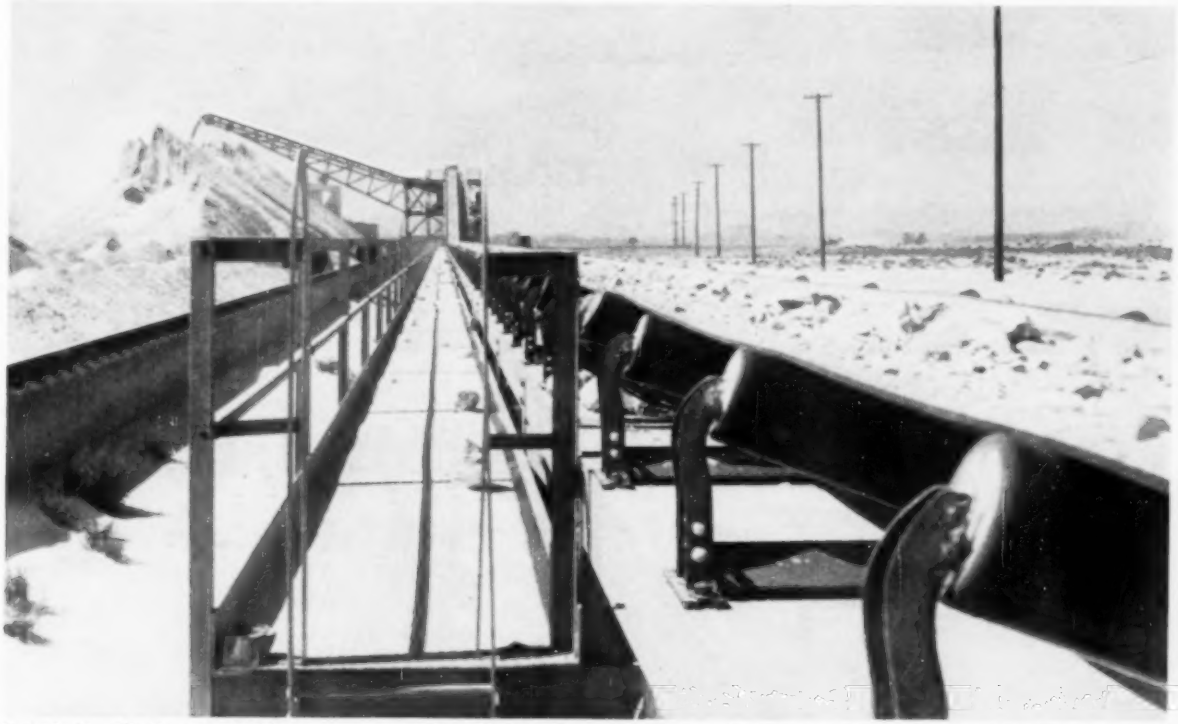
The underground method called for modified room-and pillar-removal of the material. The 22 x 27-ft. pillars were laid out in order to allow haulage to be parallel to the strike of the beds, as far as practicable, since the shuttle cars and continuous miners would not operate efficiently on grades greater than 15%. There were also a number of rolls and small faults in the ore beds, making that necessary. Where work was done on more than one level, the upper pillars were superimposed on the ones below, and intermediate low-grade beds were left as a horizontal support. Ore was left in both the foot wall and hanging wall to support the weak shale which surrounded the orebody. The ore itself was quite strong and stood well, except for occasional slabs which became loose due to a weak shale parting.

Circulate Air

Stoping areas were entered through a double entry with break-throughs spaced on 100-ft. centers and carrying the return air course on the left. About 20,000 cfm of fresh air flowed to each of six continuous miners through the right-hand entry, picking up dust generated by the machine, which was then carried off in the return air course. The continuous miners cut and loaded the ore in one operation, traveling on crawlers.

Each continuous miner was served by two shuttle cars, with 250-volt DC drive through a trailing cable from a selenium rectifier. One shuttle car, known as the transfer car, stayed at the continuous miner. When it was loaded, it transfered its ore to the second shuttle car for haulage to the ore pass. This allowed the miner to operate continuously. The shuttle cars were of 8-ton capacity and had four-wheel steering and dynamic braking. They also had dual controls, so the operator always faced in the direction of travel.

The ore pass was enlarged to provide several hundred tons storage whenever possible, discharging to a 30-in. Jeffrey entry conveyor by means of a Jeffrey electric vibrating feeder. A device made in the company's mechanical shop started and stopped the feeder automatically, always leaving enough ore in the chute to prevent short circuit of the ventilation air. The ore passes were located whenever possible to require a haul of no longer than 500 feet, and with a grade in favor of the load.



A study in white is presented by conveyor carrying material from first stage reduction toward secondary crusher in background.

Ore from the shaft pocket was fed to a Pennsylvania single-tooth roll crusher by a reciprocating feeder. The minus 4-in. crusher discharge dropped by gravity into a lower pocket, where Link-Belt automatic skiploaders filled the skips with approximately five tons of ore. The hoisting was in balance with Kimberly-type skips under the cages. They dumped into two surface ore storage bins equipped with electric vibrating feeders, which caused the discharge to drop to a conveyor system loading covered hopper-bottom cars.

There was also provision for ore to be sent through a chute to the surface stockpile, where it could be spread and reclaimed by a dozer. Ore loaded on cars was laid by a Merrick Weightometer, and the two-drum Nordberg

Continued on page 66

An 18-yd. Cat No. 480 scraper pulled by a DW21 tractor gets an assist from an Allis-Chalmers HD-21 dozer as it fills its bowl.

Hinman Builds Vermont's First Interstate Highway

IN the southeasternmost corner of Vermont, construction is high-balling on the first highway job to be let in the state under the federal interstate highway program. W. H. Hinman, Inc., North Anson, Me., holds two adjacent contracts for 5.88 miles of double-barreled limited access highway being built according to the high interstate standards. Prices of the two contracts total $3.4 million.

The construction will be part of the new Vermont Throughway running north from the Massachusetts line through Brattleboro and continuing up to Montpelier and Burlington. In all, Vermont will enjoy some 343 miles of four-lane and two-lane highways built with 90% federal aid.

The Hinman spread has been going since last June on its contracts which are officially designated as the Vernon-Guilford section of the throughway. Starting at the Massachusetts state line, the Hinman job closely parallels the present U. S. 5, which is one of the main routes leading north from New York City, but without any of the older route's twisting curves and narrow traffic lanes.

Excavation is the typically tough New England variety with plenty of ledge rock and a large amount of muck removal to boot. The location is in the pleasantly rolling low hills bordering the Connecticut River Valley. Farm woodlands cover much of the area and the brush is dense.

Contract quantities lean heavily toward the excavation side. Common excavation totals 492,000 yards while 281,000 yards of borrow are required. Of the 167,300 yards total of rock excavation, 161,300 is in solid ledge rock; 1,900 yards in trench excavation; and

Timber cut by chain-saw gangs along U. S. route 5 south of Brattleboro, Vt., goes up in smoke as Cat D6 equipped with hydraulic land clearing rake feeds fuel to the fire.

Main feature of 5.88-mile job near Brattleboro is 161,000 yards of tough ledge rock.

Caterpillar No. 12 motor grader keeps haul route level by cleaning up spillage.

4,100 yards in channel relocation. About 40,000 yards of peat must be scooped out of pockets and backfilled with stable material.

Nick DePatsy, a stocky, friendly veteran of 32 years service with the Hinman firm, runs the excavation show under Billy Hinman, Jr., project manager. Nick is the always-on-the-go type of superintendent likely to pop up anywhere on the job, shifting men and machines to best advantage and quickly correcting trouble wherever it arises.

Although work was in progress only slightly more than a month when *Excavating Engineer* paid its visit, Nick had already cut a good access road right down the middle of the job from end to end. It was full of steep grades and often curved around obstructions, but it was passable even for a passenger car.

"You've got to get your road through first," Nick observed, "or else you couldn't move a thing here. It takes time and money, but then you can send your equipment where it's needed."

Explains Job Layout

Driving along the newly pioneered road in his mobile radio-equipped Plymouth sedan provided by the construction firm, Nick explained his setup. The northern end of the job was mainly a cut-and-fill grading operation for scrapers, although there was some rock excavation to be done. The really tough work was in the middle and southern end of the job, where the muck and rock cuts ranging from slivers to as much as 65 feet, were located.

Two Northwest shovels—one a 2½-yd. 80-D and the other a 1½-yd. model C—were working loading rock to seven 11-yd. Euclid end-dumps. Disposal of rock from cuts was made in lower portions of fill areas.

Drilling crews working in two shifts were just getting into the heavy ledge rock. It is estimated that they will drill 600,000 lineal feet of rock. Equipment includes five Ingersoll-Rand WM-40 drills mounted on Air Trac carriages and three Worthington model WD wagon drills. The Air Tracs drilled 2¼-in. holes and the wagon drills 2¾-in., both using Timken carbide bits. Chicago Pneumatic 315-cfm and Ingersoll-Rand Gyro-Flo 600-cfm compressors supplied air power. Hole footage was averaging 4,000 to 4,500 per day.

Spacing between holes varied between 6 x 6 feet and 8 x 8 feet, depending on the depth and hardness of the rock. American Cyanamid 40, 60 and 75% dynamite in 1½ x 12 sticks were commonly used explosives. Powdermen detonated holes with American electric caps. The largest blast in the lighter ledge rock consisted of 400 holes drilled to 18-ft. depth and loaded with 1½ tons of explosive.

Two large clams were assigned to cleaning out soft peat bogs. One was a Marion 93M with 65 feet of boom and a 2½-yd. Owen bucket; the other was a Link-Belt 360 with a 1-yd. Owen bucket on a 60-ft. boom. Four 10-yd. Macks and three 10-yd. White dump trucks hauled away the muck and other debris.

Bodies of the trucks were built up with sideboards to increase load carrying capacity. Even so, the steep grade of the haul road in spots caused the soupy muck to overflow, resulting in slippery traction for wheels of loaded trucks pulling away from the clamshells.

Sizing up the situation, Nick DePatsy

A ¾-yd. hoe digs trench for 36-in. diameter drainage pipe. Jobs calls for installation of 12,000 lineal feet of concrete and corrugated metal pipes of various sizes.

(Left) A Cat D9 dozer builds up a high windrow of brush which is loaded into a 10-yd. Mack by 1½-yd. model 6 shovel (right).

quickly called for a small dozer to clean up the spillage from the haul road as the truck traffic moved back and forth. Watching a young fellow in charge of spotting trucks and positioning the cleanup dozer, Nick quickly corrected wrong procedure.

"Be careful," he told his trafficman, "to time your grader so that it will always follow the trucks. If you grade the opposite way with the truck behind the dozer, you're going to hold up the operation. It's a simple trick, but it can save a lot of time."

In another section of the right-of-way, a new Caterpillar D9 dozer equipped with an ATECO hydraulic ripper was rooting up stumps, small trees and brush. The huge, powerful machine smoothly swept up long, high windrows of the material with its big blade. Then, a Northwest model 6 loaded the wet material, which was too soggy to be burned, into end-dumps for disposal off the site.

Large Borrow Job

The scraper fleet hauling borrow was composed of four tractor-drawn Cat No. 80's with 21-yd. carrying capacity and three Cat DW21 motor scrapers with 18-yd. capacity. Assisting as pushers or spreaders were three D8's, two Allis-Chalmers HD-20's, a D7, D6 and D4, and an International TD-9. A Cat No. 12 grader worked full time leveling borrow which was compacted by two Bros Wobbly-Wheel and two Hyster sheepsfoot rollers.

Because the Vernon-Guilford route will be a highway with excellent grades and sight distances, numerous fills will be required along with drainage facilities. The biggest fill will contain 175,000 cubic yards of material and will be 80 feet deep.

"You never saw so many culverts in such a short stretch of road," said Nick DePatsy, "not even on jobs like the turnpike we recently finished up in New Hampshire. We've got culverts here ranging from 12 to 72 inches, including one 72-in. pipe 180 feet long."

The total amount of concrete pipe to be installed is 10,194 lineal feet. In addition, 1,844 lineal feet of asphalt-coated corrugated metal pipe ranging from 18 to 48 inches in diameter will be installed.

Trench and channel excavation is being handled by a ¾-yd. Bucyrus-Erie

(Left) A ledge of rock is cut down by a 2½-yd. 80-D shovel. (Right) Gardner-Denver WM-40 Air Tracs drill 2¼-in. blast holes.

(Above) A Link-Belt clam mucks out a peat bog with its 1-yd. Owen bucket and loads into a 10-yd. White dump truck for disposal. (Below) Powder crew loads blast holes.

22-B hoe and a 20-B hoe. The hoes will also excavate footings for various structures.

Two bridges will be built on the project to handle traffic of two intersecting local-use roads. One will be a 238-ft. overpass and the other a 99-ft. underpass. The bridge design calls for steel girders, with alpha-type steel connectors, placed on reinforced concrete piers founded on hardpan. Decks will be 9-in. reinforced concrete with a coating of asphalt.

The roadway will consist of a pair of divided highways, each with 24-ft. travel widths and 10-ft. shoulders. A 46-ft. median strip will separate the opposing lanes of traffic. Base for the travel widths will be composed of a 24-in. sub-base of crushed rock, of which 6 inches will be sand cushion; two 4-in. courses of crushed stone base course; and three inches of bituminous concrete pavement.

Paving quantities are as follows: crushed rock sub-base, 262,555 cubic yards; crushed stone base course, 41,920 yards; gravel, 10,750 yards; double-tack coat of bituminous material with pretreated pea stone seal, 78,600 gallons; single tack coat tar with sand cover, 97,800 gallons; and bituminous concrete, 31,300 tons.

Bituminous mix will be prepared by

With his brand new office headquarters in the background, Excavation Supt. Nick DePatsy (right) talks over progress of the job with Carl Luce, equipment supervisor.

portable Pioneer plants with a capacity of 100 tph. Paving will begin this summer; job completion is scheduled for November 15, 1958.

Crushed rock for the pavement subbase, gravel shoulders and bituminous mix will come from a quarry operation which Hinman has opened up just off the job site. Digging the deposit of stone is a 2½-yd. shovel. The stone is processed through a Pioneer crushing and screening plant. Trucks will be bin loaded.

The two Hinman contracts are numbered IN-I-001-1(4) and IN-I-001(5). The former is 3.989 miles long and the latter 1.890 miles. John Smyrski is resident engineer for the first contract and C. Franklin Scribner for the second. Bill Allen is project engineer for Hinman.

W. H. Hinman, Jr., is project manager and Nick DePatsy is excavation superintendent. Howard Lovejoy is bridge superintendent and Fenton Dunphy master mechanic.

Since it was founded in 1922, headquarters of the Hinman firm has been in North Anson, Me., a community of 700 located about 50 miles north of Augusta, capital city of Maine. Much of the firm's operations, however, are concentrated to the south of Portland which, with a population of 80,000, is Maine's largest city.

There Hinman operates two subsidiary firms producing construction materials. They are the Blue Rock Quarry Co. and Northeastern Paving Corp. Blue Rock quarry produces more than 500,000 tons of crushed stone a year. Its rock is a moderately hard quartzite.

Booming Market

Northeastern Paving produces bituminous mix, some of which is sold to governmental units and contracting organizations, and the remainder used on Hinman projects. Because asphaltic concrete is used almost exclusively in upper New England states for paving, there is a booming market for the firm's products. The company operates four asphalt plants—two Cedarapids and two Pioneer.

Blue Rock quarry is a two-level excavation with 30 to 40-ft. faces. Blast holes are drilled by two Gardner-Denver Air Tracs using 1½-in. diameter Timken steel and 3½-in. Brunner & Lay rock bits. Air power comes from a 1,000-cfm Ingersoll-Rand horizontal compressor.

At the bottom of the pit is a 1-yd. Bucyrus-Erie 33-B gas-air loading shovel, one of two owned by Hinman. The machines are about 30 years old and were purchased shortly after the business was incorporated. The second 1-yd. unit is being used as a stockpile shovel. Other Bucyrus-Eries Hinman owns include two 1½-yd. 38-B's; two ¾-yd. 22-B's; one ⅜-yd. 10-B; and a 25-ton 22-B Transit Crane.

The crushing plant is located above the quarry. Hauling units between the loading face and crusher are four Koehring Dumptors carrying 9-ton loads. The rubber-tire motor wagons are nicely suited to the short haul requirements of the quarry.

Primary reduction unit into which the Dumptors empty is a 25 x 36 Telsmith jaw crusher which is equipped with a heavy-duty 36 x 12 Smith apron feeder. Material passes through a 4 x 8 Allis-Chalmers double-deck scalping screen equipped with flat punched-out screens which remove all stone above four inches and divert it to the secondary crusher. This unit is a Smith Gyrosphere 36-in. gyratory which reduces the oversize and passes it to another crusher—a Symons 4-ft. cone crusher.

A series of double-deck and triple-deck vibrators positioned on various levels of the plant size the material into various grades. Vibrating units are a Telsmith 5 x 12 triple-decker with crimped edge screens and an Allis-Chalmers 4 x 8 Aerovibe double-decker. Grades of stone produced include 2½, 1½, ¾, ⅜, ¼-in. and dust. Capacity of the plant is about 100 tph.

Concrete mix is turned out in an Erie

A ¾-yd. 20-B hoe digs a footing for an overpass as a Cat D8 dozes dirt aside.

(Left) Here is the Erie batching plant at Portland. (Right) A 1-yd. Bucyrus-Erie 33-B gas-air shovel loads aggregates at quarry.

batch plant with a 100-yd. per hour capacity. The Blue Rock quarry runs a fleet of 18 transit-mixers, most of which are Smith 7-yarders.

Build Turnpike Structures

Some large construction jobs the Hinman firm completed recently are a grading contract at the $10 million Brunswick (Me.) naval air base; a 250-mile long 6-in. diameter pipeline carrying jet fuel from Searsport on the coast of Maine north to the Limestone Air Force Base near the Canadian border; and another 100-mile long 18-in. crude oil pipeline from Lancaster, N. H., to the Canadian line. The company has also played an important role in building the Maine Turnpike, which runs 106 miles from Kittery to Augusta. It contracted for some 30 structures and two large interchanges.

There are approximately 1,000 men on the payroll in all divisions during the construction season.

Officers of the firm are W. H. Hinman, Sr., chairman of the board and founder; Phil V. Corey, president; W. H. Hinman, Jr., vice president; E. H. Wyman, vice president; George Gellerson, secretary; and Henry Hinman, treasurer.

John Rice is general superintendent; Charles F. Parker, chief engineer; John R. LaPlant, chief estimator; Carl Luce, equipment superintendent; and Ray Hoffman, Blue Rock quarry manager.

A recent Hinman project near Rochester was the New Hampshire Throughway where the firm built several structures. Transit clamshell here lays riprap on embankment.

Dam and Lock Rise in Rugged Hills

Hildebrand Contractors contend with bad weather, mountainous country and cramped quarters to build structures on Monongahela River. Crawler cranes handle concrete pours.

As the crow flies, the site of the Hildebrand dam and lock construction on the Monongahela River is 4½ miles upstream from Morgantown, W. Va. Man in his automobile, however, can only reach the site after twisting and turning and shooting up and down, roller coaster style, over 11 miles of narrow, often rutted, mountain highway leading from Morgantown.

The last four miles of the trip are over a dirt road which, finally, leads down a steep grade and into a construction site flanked by the tree-bedecked mountains. The road grade was so steep in the early stages of the project that workmen had to park their cars on top and walk down.

Joint Venture

Improving this grade was only one of the preliminary problems encountered by the builders, Hildebrand Contractors, a joint venture of the J. A. Jones Construction Co., Charlotte, N. C., and Charles H. Tompkins Co., Washington, D. C.

Particularly disheartening to the spread, headed by big, friendly J. Frank Hodges, a veteran project manager, was the fact that foul weather impeded progress for almost an entire working season.

"We got on the job in May 1956," said J. Frank Ligon, the youngish, soft-spoken Virginian, who is office engineer. "When we arrived, it snowed. Then it rained until October. After that, we got six good weeks of weather. Then it rained all winter. We actually lost a whole season. We wanted to concrete the first season, but couldn't."

Wet weather, combined with cramped working quarters led to difficult excavating and disposal condi-

Construction of the lock was well advanced in late summer when this aerial photograph of the Hildebrand project was taken.

A 4-yd. bucketful of concrete is lifted from a Ferree trailer by a Bucyrus-Erie 71-B crane equipped with 90-ft. boom. The 600-ft. lock requires 90,000 yards of concrete.

tions. The only place to dump the soil was 1,000 feet or more from the excavation, with the loaded dumps accounting for an increase of 120 feet in elevation at times. An aggregate storage center was created on top of the spoil, but not without difficulty. Water would not drain out of the saturated waste, which wouldn't support trucks and bulldozers. All breathed easier when the rain finally stopped and allowed the moisture to loose itself from the spoil.

Scrapers and shovels normally could have handled the excavation, but the wet material dictated some use of a 4½-yd. dragline.

Hildebrand lock and dam, a project being constructed for the U. S. Corps of Engineers, U. S. Army Engineer District, Pittsburgh, Pa., will replace locks and dams Nos. 12 and 13 on the Monongahela. The contract price is $9 million.

The lock will have a useable length of 600 feet and a width of 84 feet. Its lift will be 21 feet. Upper guide walls will be 650 feet long on the land side and 300 feet on the river side. A lower guide wall on the land side will be 600 feet long. A guard wall will be more than 150 feet long. The walls will be of the concrete gravity type, founded in rock. Hydraulically-operated mitre gates will be installed at both the upper and lower ends of the lock. Tainter valves will control the filling and emptying system for the lock chamber.

The dam will be 530 feet long, 60 feet wide and 40 feet high to the crest of the fixed weir. It is 74 feet to the top of the piers. The dam will have eight spillway openings, two of which will be uncontrollable weirs allowing the passage of one foot of water. Tainter gates will control the other six openings. The dam will be founded in rock. A service bridge will be built across the dam.

Barges loaded with coal ply their way to market on the Monongahela. To maintain an uninterrupted flow of navigation, the dam and lock are being constructed in four stages through July 1959.

Construction of the lock is being effected in stage 1. Work was well advanced when *Excavating Engineer* visited the site in late September. The 90,000 yards of concrete required by the lock were to have been placed by the end of the 1957 season.

Stage 2 calls for construction of an abutment wall on the opposite side of the river. The initial stage of the dam will be constructed in stage 3 and the second half will be built in stage 4.

Concrete requirements are 90,000 yards in the lock and 40,000 yards for the dam, a total of 130,000 yards. All but 15,000 yards are scheduled to be placed before the start of the 1959 season.

Longest of four cofferdams required

Continued on page 19

Another large crane helps set up wood forms for next concrete pour on lock wall.

Only **PAYLOADER**® can give you

as a Side Boom . . .

. . . this new SUPERIOR-HOUGH boom attachment further increases the all-around usefulness of a "PAYLOADER" tractor-shovel. A Hough exclusive on rubber-tired units, it *adds* a handy lift-and-carry facility, lets the "PAYLOADER" alternate between boom and bucket work at any time.

You can load, unload and string pipe, carry girders and sheet steel, handle piles and poles . . . or, dig and backfill dirt, load dump trucks, charge hoppers and the like — all without any time loss to change attachments.

Available for the big model HO "PAYLOADER", this side boom has 6000 lb. capacity, its 10 ft. length can be telescoped to 16 ft. maximum. This, combined with the sturdy 4-wheel-drive tractor-shovel performance, provides an economical one-machine answer to many construction and maintenance problems.

Big rubber tires permit working on pavement, over sidewalks and curbs without damage; 4-wheel-drive tractive power qualifies it for cross-country work as well.

PAYLOADER®
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

1-B-1 A

as a Spreader . . .

. . . another new and exclusive attachment that multiplies the work-ability of "PAYLOADER" tractor-shovels. Substitute this Ram Spreader attachment for the bucket and you have an economical unit that lays down 8-ft. wide strips of hot or cold mix asphalt in a single pass.

You can use it to place new pavement, to do resurfacing or patch work on streets, driveways, alleys, sidewalks, playgrounds, parking lots. Attached to the maneuverable "PAYLOADER", the machine can work in close quarters where pavers and trucks can't operate.

Spreader features include a 2-cu. yd. capacity hopper that is independently suspended on four pneumatic tires. A separate air cooled gas engine provides pressure for the hydraulic motor drive of the twin 8" diameter augers and for all hydraulic control cylinders.

Operator has convenient control levers to adjust main feed gate, thickness and width. Sliding type gates adjust for widths to 48 in.; gates are removed for 8-ft. width. See your nearby "PAYLOADER" distributor for complete details.

PAYLOADER®
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

1-B-1 B

this Versatility, Speed and Economy

as a 4-in-1 . . .

. . . a "PAYLOADER" handles many jobs other wheeled tractor-shovels can't touch. Equipped with a DROTT "4-in-1" bucket, it combines shovel, clamshell, scraper and bulldozer action in a single tool.

The "4-in-1" actually gives you the utility performance of four machines *plus* the mobile speed and tractive power of a 4-wheel-drive tractor-shovel. "PAYLOADER" is the only rubber-tired tractor-shovel available with this patented "4-in-1" bucket.

This combination of rubber-tired tractor mobility and bucket versatility provides complete on-job flexibility. You can dig, carry and dump (shovel) . . . pick-up, grasp and handle (clamshell) . . . scrape, strip, grade and spread (scraper) . . . backfill, clear and doze (bulldozer).

Reliable 4-wheel-drive "PAYLOADER" performance is assured by power-transfer differentials, "no-stop" power-shift transmission and torque converter, planetary final drives, power-steering and power-brakes plus exclusive 40° tip-back at ground level.

PAYLOADER®
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

1-B-1 C

as a Back Hoe . . .

. . . the "PAYLOADER" becomes a mobile trenching unit. With a quick interchange of bucket and hydraulically operated Wain-Roy hoe attachment it can work in a 190° radius, dig to 12' depth to install service connections, foundations, bell-holes and footings easily and economically. It can dig and dump at any angle up to 95°, right or left—a valuable feature in close quarters and heavy traffic areas.

The unit operates with only four control levers. Twin hydraulic cylinders provide a powerful digging and break-out force. Self-leveling hydraulic stabilizers relieve the tractor of undue strains. The extra work capacity you get with this back-hoe attachment at a nominal investment is worthwhile.

For Your Convenience . . .

PURCHASE AND HOUGH LEASE PLANS

Now your Hough Distributor has at his disposal the broadest and most complete set of financing plans ever offered: — TIME PAYMENT . . . LEASING PLANS,* with or without OPTION TO PURCHASE — any and all kinds of financing to best fit your needs for the purchase of "PAYLOADER" equipment. See him today!

* (Available in Continental U.S.A.)

1-B-1 D

A D8 dozer maintains aggregates stockpile required by batch plant. A total of 130,000 yards of concrete was used in structures.

Hildebrand . . .

Continued from page 35

to protect the working area is the one for the lock. It stretches 1,100 feet. About 500 feet of it is of steel cellular construction. Inside diameter of the 18 cells, which are filled with soil from the excavation, is 25 feet. Pilings 25-ft. long were driven with a McKiernan-Terry pile hammer on a Bucyrus-Erie 54-B crane. About 600 feet of the lock cofferdam is a dike with a steel sheet piling cutoff. The dike protects construction of the lower guide wall.

A 400-ft. long cofferdam, composed of gravel-filled cells 28 feet in diameter, protects the site of the abutment excavation on the opposite side of the river. Steel sheet pilings here are 30-ft. long.

Two 500-ft. cofferdams will be constructed for each stage of the dam construction. Piles 30-ft. long will be driven in the initial stage; 40-ft. lengths will be driven in the second stage.

Excavation will total about 650,000 yards—500,000 yards of common and 150,000 yards of rock, mostly shale with some sandstone.

More than 400,000 yards were excavated from the lock area, which measured 3,800 by 200 feet, including the approaches. Some of the excavation in the lock was sub-contracted to Claude Janes, Chester Hill, Ohio, who used 6 and 7-yd. LeTourneau-Westinghouse Tournapulls. Battling rain and wet material, Janes' fleet hauled an average of 1,000 feet, sometimes climbing 120 feet to dump.

Hildebrand Contractors purchased especially for the dam and lock job a 3-yd. crawler-mounted Bucyrus-Erie 71-B excavator with a General Motors 6-71 diesel engine and a torque converter. This machine did not take long to prove its versatility.

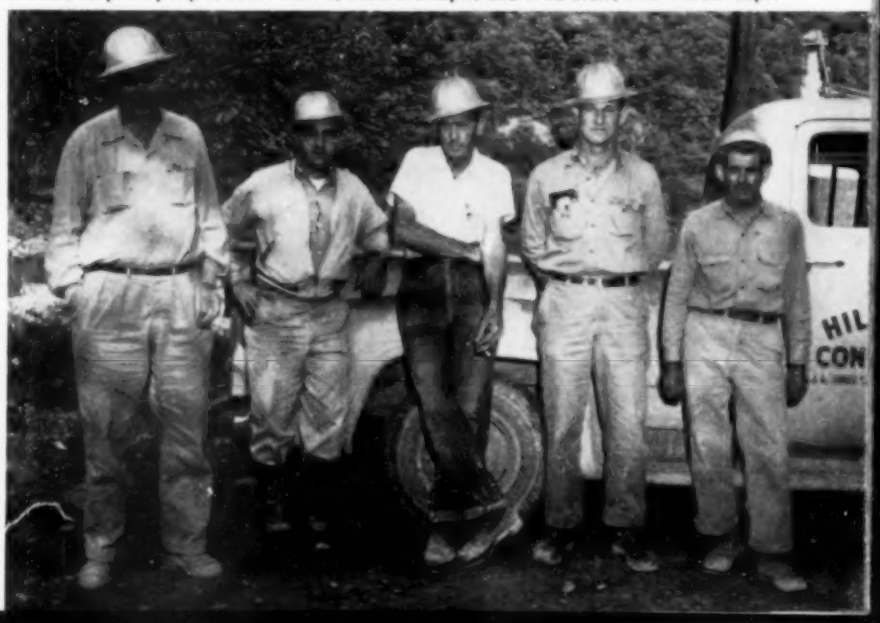
Strip Topsoil

First assignment for the 71-B was to strip the wet and soft common with a 4½-yd. Hendrix lightweight perforated dragline bucket. Later, the 71-B was rigged with the standard 3-yd. shovel front end to excavate the rock and load it to four 17-yd. Euclid end dumps. When concreting time arrived, the 71-B was designated as the machine that would pour the entire bulk load required by the project. More will be said later about the concrete work.

With the 71-B on concrete, a Bucyrus-Erie 38-B with a 1½-yd. shovel completed the excavation for the lock. Two 38-B's with 60 to 70 ft. booms and 1½-yd. clam buckets were to be used in conjunction with barges during the excavation of 10,000 yards of common and 4,000 yards of rock for the dam abutment.

Because of a railroad and the high bluffs, no dumping space is available on

Project Manager J. Frank Hodges (left) is with W. E. Haynes, field engineer; S. H. Prater, carpentry supt.; Scott Norris, concrete supt.; and Fred Blair, iron worker supt.



the east side of the river. This meant that one of the 38-B's would excavate and load directly to a barge, which would be taken to the west bank. There, the other 38-B would unload the material into Euclid end dumps for hauling to the regular dump pile.

When *Excavating Engineer* visited the job, one of the 38-B's had moved into position on the other side of the river to begin the abutment excavation. The other 38-B was dropping stockpiled rock over a grizzly for sizing.

Hodges plans to use either a 38-B or a Bucyrus-Erie 54-B with a 2½-yd. clam for the dam excavation.

Rock drilling was handled by two Gardner-Denver Air Tracs putting down 2½-in. holes to a depth of 20 feet on an 8x9 pattern. The powder ratio was a half pound per yard of rock. A Joy quarry bar was used for line drilling.

Bulldozing chores are handled by an Allis-Chalmers HD-21 and two Caterpillar D8's. Two Allis-Chalmers front-end loaders—an HD-11G and an HD-6G—feed the batch plant.

Hildebrand's semi-automatic Johnson batch plant has two 2-yd. mixers producing a maximum of 108 yards per hour, a figure that often has been reached. Sand and limestone aggregates in four sizes—¾, 1½, 3 and 6-in.—are trucked to the plant from Greer Limestone Co., Greer, W. Va. Between 15 and 20 dumps of 15-tons capacity haul in 1,000 yards of aggregate a day. Greer is 22 miles from the job site. Stockpile capacity is 30,000 tons. Cement is delivered on the Monongahela Railroad from a plant north of Pittsburgh.

Concrete is delivered to the 71-B in 4-yd. Johnson half-dump buckets carried on two tractor-trailer units. Each unit has space for three buckets—two full and one empty. The Ferree trailers are pulled by a Ford F-800 and a Mack 851 trucks. Another Ford is in reserve.

Hildebrand officials are happy with the fast and high-capacity concreting performance of the 71-B. Working with a 90-ft. boom and a 4-yd. bucket, the 71-B has poured as much as 2,800 yards of concrete a week. Concrete is poured

(Right) Stockpiled rock is dropped over screen by clam for sizing. (Below) This mobile Transit Crane is job's busiest machine.

is powered by a GMC 3-71 diesel engine, carries a 65-ft. boom and a 20-ft. jib. The carrier has a White gasoline engine.

About 325 men are employed in two shifts; another 10 men work a third shift. A completely-equipped 20x40-ft. maintenance shop is prepared to do complete overhauling jobs.

Other Hildebrand officials include: E. F. Fry, master mechanic; Scott Norris, concrete superintendent; S. H. Prater, carpentry superintendent; W. E. Haynes, field engineer; Fred Blair, iron worker superintendent; H. H. Hardy, warehouse superintendent; and C. H. Howe, office manager.

Col. H. E. Sprague is district engineer, Pittsburgh District, Corps of Engineers. J. S. Minnotte is chief, construction division; and E. P. Daugherty is resident engineer.

(Above) Shovel loader charges conveyor leading to the batch plant with sand. (Below) Batch plant has electronic controls.

five days a week on an afternoon shift beginning at 4 o'clock. "We can pour to a 60 or 65-ft. radius easily with the 71-B," said General Superintendent Kenneth Flanagan.

Concrete for the lock was being poured in straight 5-ft. lifts, using Blaw-Knox steel cantilever forms. Where wall armor was specified, special Blaw-Knox forms were employed. Forms for the dam piers will be specially built. Cantilever forms will be used on the abutments.

Barges Carry Cranes

Barges will be utilized for concreting of the dam. Hodges is thinking of driving truck and trailer on the barge and floating it out to the placing area. The 71-B will work off the cofferdam.

When it isn't pouring concrete, the 71-B joins the 54-B in handling forms and steel before or after pours. The 54-B now needs a 90-ft. boom to reach over the lock wall. It is powered by an 8-cylinder Buda diesel.

A Bucyrus-Erie 22-B Transit Crane, purchased new for this job, is the busiest piece of equipment on the job, Hodges said. The 22-B perhaps performed six or seven different jobs in the few hours *Excavating Engineer* observed it—such jobs as loading and unloading trucks, hoisting forms into place, handling steel and various other yard chores that kept it moving continually. The 22-B, which

Hildebrand Contractors personnel include (from left): Kenneth N. Flanagan, J. Frank Ligon, E. F. Fry and H. H. Hardy.

Under adverse conditions, it pays to remove accumulations of mud, dirt and other debris that can cause engine overheating.

Engine Expert Prescribes:

Simple Care for Tractor Cooling Systems

By V. A. Woodling
Manager, Service Training
Caterpillar Tractor Co., Peoria, Ill.

A diesel engine's overheated cooling system can mean profit-losing down time. Here are some basic suggestions to keep cooling systems in your earthmovers in good working order.

DIESEL engines of most earthmoving machines have cooling systems which are similar in design. Related items such as an oil cooler, a torque converter or cab heater vary the basic system only slightly. The small amount of time required to properly care for this system will result in better machine performance, longer engine life and less down time.

Two schematic diagrams below show the basic cooling system found on most crawler tractors. In figure 1 the cooling system is operating with the temperature regulators closed—a normal condition when the temperature of the coolant is less than approximately 170° F. With the temperature regulators closed, coolant is circulated by the pump only through the cylinder head, block and regulator housing. A by-pass in the regulator housing returns the coolant to the pump inlet.

The second diagram, figure 2, shows the cooling system operating above 170° F, with the temperature regulators open. Here the coolant is allowed to flow into the radiator permitting the maximum cooling capacity of the system to be used. These two diagrams illustrate the function of temperature regulators—the "watchdogs" of the cooling system.

Too often, however, regulators are unjustly accused of causing an engine to overheat. Usually the first thought is to remove and discard them at the first sign of overheating. Don't jump to this conclusion. Actually, overheating can result from a number of defects and incorrect operating procedures.

Before removing and discarding temperature regulators, a systematic check of the cooling system should be made. Ordinarily, the first indication of overheating is noted on the temperature gauge. It should not be assumed that the temperature gauge is always correct. First, remove the radiator cap (caution should be exercised when doing this on a pressurized system) and insert a reliable thermometer into the coolant. This should be done with the engine running since coolant temperatures in the top tank rise immediately after shutting down an engine.

If the thermometer indicates that the engine is overheating, a systematic check

Figure 1. When regulator is closed, the coolant is circulated only through cylinder head, block and regulator housing.

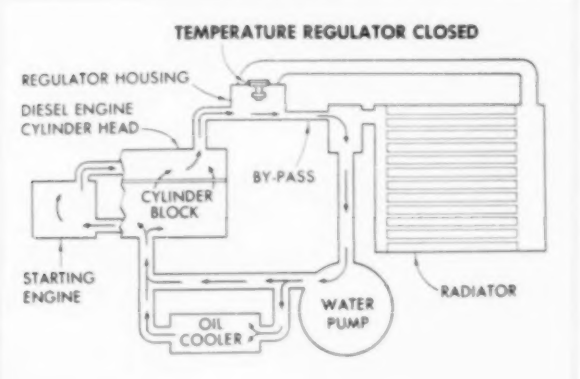
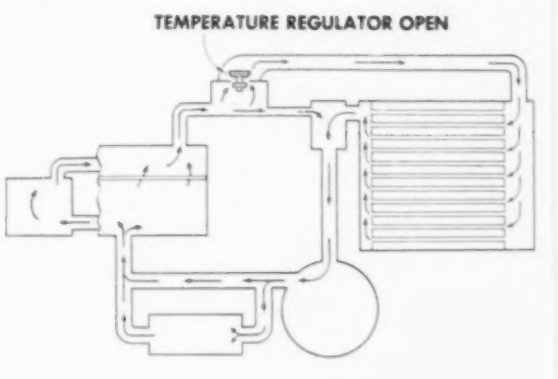


Figure 2. When regulator opens at 170° F, the coolant is allowed to flow into the radiator where the cooling begins.



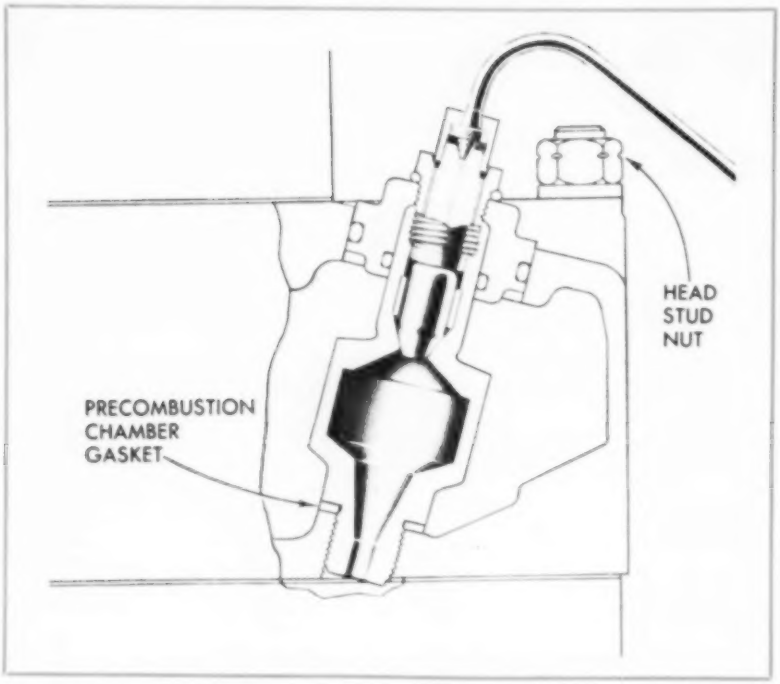


Figure 3. Air in the cooling system is a common cause of engine overheating. Two likely reasons are a loose precombustion chamber gasket or loose head stud nuts.

should be made to determine the cause. Begin with an inspection of the radiator core by looking for signs of scale, dirt or other clogging agents. Using soft water and a rust inhibitor recommended by the machine's manufacturer will greatly reduce scale and rust deposits in the system.

Check Air Flow

A free flow of air through the radiator fins and around the engine is equally essential to adequate cooling. Inspect the radiator core fins to see if they are damaged or bent or simply plugged with mud or trash. A loose fan belt or bent fan blades is also a common cause of overheating. Operating a diesel engine at continuous overload is another.

If, after checking these items, the cause of overheating is not found, remove the temperature regulators. If the engine still overheats with the regulators removed, they are not the cause of the trouble and should be reinstalled immediately. Should the engine run at normal operating temperatures with the regulators removed, it is evident that they are at fault and new regulators should be installed. It is important not to operate the engine any longer than necessary with the regulators removed.

Air in the cooling system is another common cause of engine overheating. Air can enter the system in several ways. The most probable causes are a low coolant level, a loose or damaged precombustion chamber gasket (see figure 3) or loose head stud nuts.

Air in the cooling system can result in cracked cylinder heads or other serious engine damage. If not quickly exhausted from the cooling system after completely filling the radiator, air will displace water from the cylinder head, allowing the normally hot parts to operate at even higher temperatures.

A simple check, sometimes called the "bottle test" (see figure 4), will indicate if air is present in the system. The equipment required to perform this check consists of a bucket of water, a length of hose which will fit over the radiator overflow tube and a quart bottle.

To begin the test, fill the cooling system and operate the engine at high idle for at least five minutes after the engine reaches operating temperature. Shut the engine down, make sure that the radiator cap is tight and place the rubber hose over the end of the overflow tube. Fill the bottle with water, insert the loose end of the hose into the bottle and invert the bottle in the bucket filled with water. Start the engine and operate it at high idle.

The following water displacement rates are considered maximum. Four and six-cylinder engines—one pint per minute; eight-cylinder engines—one pint per 40 seconds; 12-cylinder engines—one quart per minute. If the water is expelled from the bottle in less time, air or gas leakage into the system is excessive and the source must be located and corrected. Continued operation with excessive air or gas flow into the system may result in serious engine damage.

Further possible causes of overheating may be in the water pump, or from restrictions in the water jacket, lines or hoses. One cause of overheating which should not be overlooked when trouble shooting crawler tractor cooling systems is a clogged crankcase guard. Dust, mud and other debris are good insulating ma-

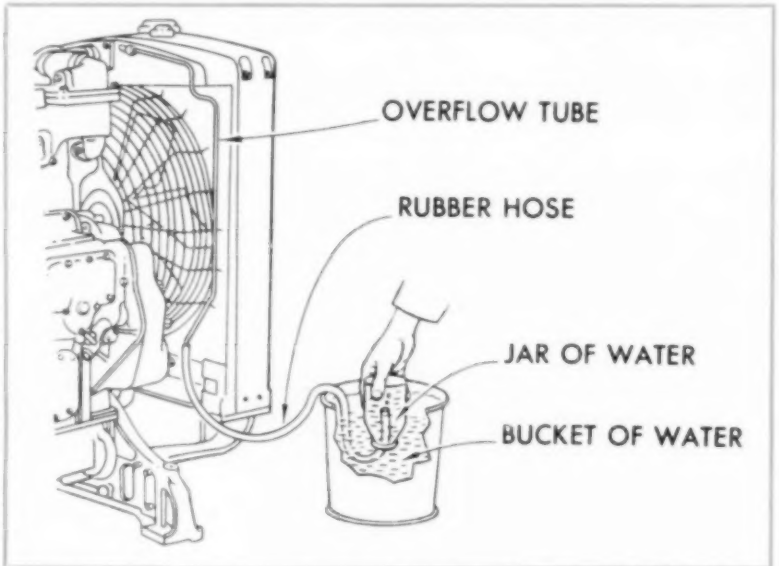


Figure 4. A simple bottle test will indicate whether air is present in the cooling system. A bucket of water, short length of rubber hose and quart bottle are required.

terials which may cause the temperature of crankcase oil or torque converter fluid to be raised to such an extent that overheating in the cooling system occurs. Frequent inspections of the guard can prevent this problem.

Overheating of track-type tractor's diesel engine equipped with torque converter may result from several reasons other than those previously listed, since torque converter cooling is usually a function of the basic cooling system.

A torque converter, like most units transmitting torque, operates more efficiently through a certain range. The most efficient point of operation is when output shaft speed is equal to approximately one-half input shaft speed. However, satisfactory operation can be obtained when output shaft speed is as low as one-third or as high as three-fourths of input shaft speed.

When the output shaft operates for extended periods of time at speeds that are lower or higher than the recommended speed range, the torque converter may overheat. Operation in the zero to one-third range indicates too great a load, while operation in the three-fourths and above range indicates too light a load is being applied to the torque converter. In either case, heat is generated by the rapid circulation of fluid. This heat must be absorbed by the cooling system.

Avoid Prolonged Idling

In no case should the engine be allowed to operate at or near high idle speed with the torque converter input shaft coupled to the engine and no load on the output shaft. Overheating will probably occur in a matter of minutes. Also, with the engine operating at low idle speed and the torque converter coupled to the engine, overheating will occur, but after a much longer period of time. If the torque converter is equipped with a clutch, the clutch should always be disengaged when the engine is idled. If the torque converter is not equipped with a clutch, experience will determine how long the engine may be safely idled at low speed before overheating of the torque converter will result.

In most cases, overheating of this type can be prevented by observing the torque converter temperature gauge and, when necessary, shifting gears or readjusting the load or engine speed to operate within the recommended limits.

Overloads on any engine for extended periods will, of course, result in slower fan speeds and, eventually, overheating.

GUARANTEED CAPACITY

CROSBY-LAUGHLIN

"LOAD RATED" SHACKLES are 50% STRONGER than common shackles!

Size for size, new Crosby-Laughlin* "Load Rated" Shackles are *50% stronger* than common shackles! And you buy guaranteed capacities ranging from ⅓ to 75 tons with the safe working load permanently forged on every shackle.

"Load Rated" Shackles are forged from special alloy steel that has exceptional strength and fatigue resistance. Perfect pin alignment—that distributes stresses equally over the bow—results from drilling pin holes in precision jigs after forming. Heat treated alloy steel pins and bolts in Crosby-Laughlin Shackles are always larger in diameter than the shackle body for additional safety.

Now you can demand—be positive you're getting—*genuine* Crosby-Laughlin "Load Rated" Fittings because they're painted bright RED. It's the quickly recognized symbol of safety *and* the world's most complete line of drop forged fittings for wire rope and chain.

*TRADEMARK

FREE NEW CATALOG . . .

lists over 2000 items . . . lets you order Crosby-Laughlin "Load Rated" Fittings the safe way—by capacities . . . includes detailed specifications and dimensional data . . . available now at construction and industrial equipment distributors and mill supply houses—or write direct.

Stocked and Sold by Leading Distributors

CROSBY-LAUGHLIN *Division*

American Hoist and Derrick Company

FT. WAYNE 1, INDIANA

Students of Texas A. & M. College's new heavy equipment operators' school train in an undeveloped area near the campus.

News from the Field

Texas A. & M. Runs Operators' School

A new idea in teaching operation of earthmoving equipment was recently innovated when, for the first time in a public institution of higher learning, the Engineering Extension Service of Texas Agricultural & Mechanical College set up a heavy equipment operators' school at College Station, Tex.

Designed as a training ground for beginners, the school provides supervision necessary to avoid serious and costly damage to contractors' earthmoving machinery while an operator is learning. It also benefits contractors by leaving free machinery which would otherwise have to be tied up during the training period for new help.

Entrance fees of $350 are paid either by students who attend the school on their own, or by contractors who send them. A graduate receives a certificate designating him as a competent operator of the type equipment on which he specialized during instruction.

Classroom work is held to a minimum. All remaining instruction time is spent in an undeveloped area of several hundred acres near the campus, where students learn to operate the earthmoving machines — including 22 tractors, dozers, scrapers and loaders. The instructor staff, all recruited directly from industry, critically supervise the operations, offering help where needed, but mainly letting students work out their own problems.

Idea of the school dates back several years and is a product of long range planning and many conferences. In response to a request by the Associated General Contractors of America, Texas Highway-Heavy Branch, officials of the school sent a man to North Carolina to observe a commercial school for heavy equipment operators. They wanted to see if a similar school could be set up in Texas. Other related schools and factory service agencies throughout the United States also were checked for operational techniques.

The first of a series of the six-week schools began in November 1957. A second school, with limited enrollment, was scheduled to open Jan. 20.

Pipe Pre-Assembly Saves Time

Partial pre-assembly of reinforced concrete pipe sections resulted in substantial time savings during the recent construction of an 1,100-ft. long interceptor sewer across the Allegheny River in Pennsylvania, six miles above metropolitan Pittsburgh.

The 30-in. diameter sewer was built by Dravo Corp., Pittsburgh, for the Allegheny County Sanitary Authority sewage disposal system. Laid in a trench as much as 28 feet below the surface of the river, it will carry both sewage and surface water from the greater Pittsburgh communities of Aspinwall, Sharpsburg, Blaw-Knox, Verona and Montrose.

The interceptor sewer connects with a trunk sewer which will run under downtown Pittsburgh on its way to the Woods Run treatment plant three miles down the Ohio River.

Since all connections in the interceptor sewer had to be made by a diver, it was decided that the diver's underwater time could be substantially cut by reducing the number of connections. This was accomplished by pre-assembling ten 96-ft. pipe sections which consisted of six 16-ft. sections each.

About seventy 16-ft. sections of the heavy-duty pipe were used in the entire

Continued on page 48

A 4-ton rig mounted on a derrick boat lowers a 96-ft. length of concrete sewer pipe into the Allegheny River. Six 16-ft. sections were bolted together to form the pipe.

Cone Bros. Contracting Co. is using the following Caterpillar-built equipment on this job: DW21-No. 470 LOWBOWL Scrapers; D9, D8 and D7 Tractors and a No. 12 Motor Grader. The DW21 units have a capacity of 25 cu. yd. heaped, 18 cu. yd. struck. Their LOWBOWL design pays off in high production at lower cost per yard.

"We have observed other machines and have come to the conclusion that our Caterpillar-built rigs have much less down time. We have found them more dependable. We're 100% Caterpillar on this job." **Charles E. Bailes, Jr., Superintendent of Cone Bros. Contracting Co., Tampa, Florida.**

Five DW21-No. 470 LOWBOWL Scrapers spearhead the Caterpillar line-up used by Cone Bros. on a 23-mile, $1,500,000 road building project in Florida. One section, running 12 miles from U. S. 41 at North Naples to Immokalee, involves moving about 500,000 cu. yd. of sand and marl. In extremely heavy going, the five DW21s hauled 120 loads in 10 hours over the two-mile round-trip. Each DW21 unit carried 21 cu. yd. per load. Here you see one of them being push-loaded by a D9.

CAT LOWBOWL Scrapers for lower cost per yard. As Superintendent Bailes observed, Caterpillar-built rigs "have much less down time" and "are more dependable." These are factors in high production. And in the case of Cat Scrapers, there's another big factor—exclusive LOWBOWL design. On job after job, matched against current models of other makes, Caterpillar LOWBOWL Scrapers have handled material at lower cost per yard. This is a fact, not a claim. It is completely documented by data covering road conditions, materials handled, load times, haul times, cycle times, bank yards per trip as well as the real payoff—cost of dirt moved per yard, the only true measure of a machine's productive capacity!

Your Caterpillar Dealer has proof. All these job facts are on file at your Caterpillar Dealer's. Have you seen them? They'll give you a good idea how Cat LOWBOWL Scrapers can lower your earthmoving costs. Your dealer will be glad to show them to you. He'll be glad to demonstrate, too—just say when and where, he'll be there!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED— THE HARD WORK

THE LATEST, MOST COMPLETE INFORMATION ON THE NEW HIGHWAY PROGRAM — FREE

Here in one booklet is all the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways; final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

DEPT. EE2, Caterpillar Tractor Co. Peoria, Ill.

Please send me immediately ..... copies of "The Road Ahead."

Name .....

Company .....

Address .....

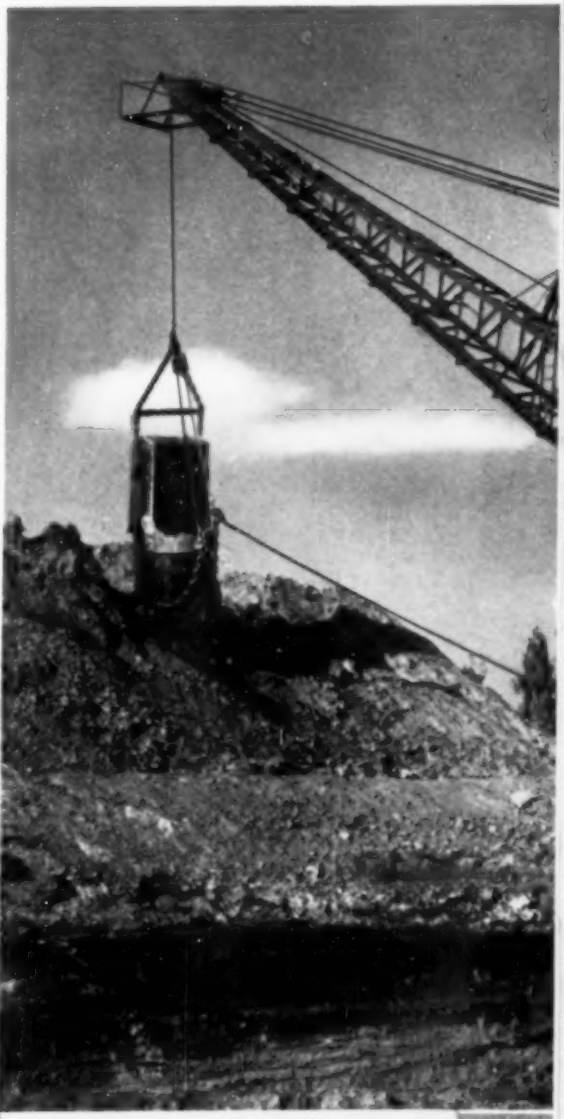
City ..... Zone ..... State .....

In the Low-Cost Production Race
Bucyrus

The economical operation, big production and year-after-year dependability of Bucyrus-Erie walking draglines make them pace setters wherever big volumes of material must be moved at lowest possible cost. You'll find them in mines and quarries from Missouri to Sweden . . . from Pennsylvania to British Guiana.

Each member of this famous line, from 4 to 36 cubic yards, brings you the same low cost and dependable performance that have been associated with Bucyrus-Erie walking draglines for years. Heavy-duty construction from base to boom point cuts maintenance costs, adds years to machine life. Each machine has *proved* Bucyrus-Erie design superiority — a front end that's very strong yet light in weight — exclusive walking action with simplicity that reduces maintenance, gives you cushion-smooth moveups — Ward Leonard variable-voltage swing motors on both Diesel-powered and all-electric-powered machines speed cycles, boost output. These and many other features combine to give you a high-volume, low-cost-yardage excavator that sets the pace wherever it works.

129L57C



BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WIS.

7-W *strips overburden in a Georgia clay mine with 6-cu. yd. bucket on a 160-ft. boom.*

-Erie *Walkers* Set the Pace

180•W *swings 6-cu. yd. bucket on 120-ft. boom to build an earth dam for settling area in owner's phosphate mine in Florida.*

200•W *with a 6-cu. yd. bucket on a 110-ft. boom keeps haul units busy on a section of the St. Lawrence Seaway.*

News . . .

Continued from page 44

project. Cast by Allegheny Concrete Pipe Associates, the pipe has 5-in. thick walls, reinforced with steel mesh, and weighs 620 pounds per foot.

Pre-assembly of some of the king-size sections was made in hopper barges, which were used to ship the pipes to the job site. Others were assembled after the 16-ft. sections had been transferred to deck barges. Each connection was made by bolts passed through lugs set in the ends of the sections. Each joint was sealed with a rubber gasket.

A derrick boat, utilizing a special 4-ton rigging which supported the 30-ton pipe section in seven wire rope slings, swung the assembled section off the barge and lowered it into the trench in the river bed.

A diver issued instructions to the derrick boat crew by telephone. With the assistance of a second derrick boat, the pipe was slowly shifted until its tapered end slipped into the recessed end of the previously laid section and formed a watertight connection against the rubber gasket.

After bolting the new joint, the diver walked the length of the pipe, backing off the bolts of the pre-assembled sections to allow for settlement. A pile was then driven at the riverward end of the pipe and a cable from the pile looped around the pipe to hold it in position while a dredge backfilled the trench.

To allow sufficient fall to the trunk sewer, the interceptor is entrenched on a slope ranging from 16 to 28 feet below normal pool. This meant that, because of variations in the river bottom, the trench had to be excavated through from 7 to 26 feet of mud, gravel and fire clay.

"Psst, boss—where's the men's room?"

The Allegheny County Sanitary Authority's program embraces some 63½ miles of interceptor sewers and serves 68 municipalities, including the city of Pittsburgh. This represents 1½ million people in an area of more than 200 square miles. When completed, the project will diminish pollution of Pittsburgh area rivers by 150 million gallons of sewage daily.

In addition to a number of interceptor lines and diversionary structures, Dravo is constructing a 10-mile stretch of the main trunk sewer, working as much as 100 feet below ground level.

Improvise Street Ripper

Los Angeles' Department of Public Works must maintain 4,800 miles of streets within the 450 square miles of the California metropolis.

When faced in 1954 with the job of rebuilding a number of boulevards, the department sought a heavy-duty tractor with a bulldozer and a big ripper to tear up old surfacing. A single unit was desired—one that could move freely from job to job over city streets under its own power.

A LeTourneau-Westinghouse Model C Tournatractor most closely met the department's specifications, but LeT-WesCo offered no integral-mounted ripper. Department officials contacted the Crook Co., LeT-WesCo distributor in Los Angeles. Crook agreed to manufacture the ripper and install it on a Tournatractor.

The department is proud of its creation, which is functioning perfectly after three years' service. The rig already has worn out six shanks and more that 100 teeth.

A Tournatractor with a special integral ripper tears up old blacktop prior to the rebuilding of a section of a boulevard by the Los Angeles Department of Public Works.

Beavers Honor Nine

Nine prominent figures in western heavy engineered construction were honored at the third annual Beavers awards dinner held January 16 at the Biltmore Hotel, Los Angeles, Calif. Awards were presented in the following divisions:

Management: J. C. Maguire and L. S. Corey.

Supervision: R. M. Conner and A. E. Graham.

Engineering: Ross White and H. E. Hedger.

Supply: R. G. LeTourneau and Guy C. Kiddoo.

Special (for reclamation engineering): L. N. McClellan.

Ernest G. Swigert, president of the National Association of Manufacturers, addressed members of the Beavers and their guests from business, government and military circles.

George H. Atkinson presided over the 1958 awards day activities, marking the end to a year's service as president of the Beavers organization. He is president of Guy F. Atkinson Co., South San Francisco, Calif.

Seaway, Power Projects Report Progress

Construction on the United States portion of the St. Lawrence Seaway project, extending some 114 miles from below Massena, N. Y., to Tibbets Point on Lake Ontario, was more than 75% complete on Nov. 1, 1957, according to a recent progress report issued by Seaway Administrator Lewis G. Castle.

Featured in the report was the advanced status of the mainland portion

Continued on page 50

GYRO-FLO *in the news*

3300 cfm of Gyro-Flo Air Power Helps Prepare Excavation for New Skyscraper

Scale model of new Chase Manhattan Bank Building, now under construction in down-town Manhattan. Foundations for this structure will be set in solid rock, 85 feet below street level.

In downtown Manhattan, New York City, there is in progress "the" most difficult foundation job in the world – The Chase Manhattan Bank Building Foundation. The sixty story edifice of steel and glass will be set on a foundation carried down to and into solid bed rock, at a depth of 85 feet below street level.

The foundation construction, the most important phase of the complete project, is progressing rapidly under the skilled management of The Foundation Company, George M. Brewster, and Joseph Miele Construction Co. with Lou Miller as project manager, Gene Fullam, General Superintendent.

SIDEWALK SUPERINTENDENTS

To the "sidewalk superintendents" who daily help oversee the job, Ingersoll-Rand Gyro-Flo compressors have been a familiar sight. When the job first started, there were five of them down in the big open pit (one 900 cfm and four 600 cfm units) supplying 3300 cubic feet of air per minute for the drilling operation. As the job rapidly progressed and the need for air decreased, three of the 600 cfm units were taken off the job and placed at another.

Not so conspicuous, but equally important, are the rock drills which operate deep below the surface. Line-hole drilling, four holes to the foot, is accomplished at a rapid pace by Ingersoll-Rand DB35 drifter drills with JHM Wagonjack mountings on 20-foot quarry bars.

WINNING COMBINATION

This combination – Gyro-Flo air power and I-R rock drills – has helped building contractors meet the tightest schedules on major jobs all over the world. Gyro-Flo rotary compressors, available in sizes from 85 cfm to 900 cfm, deliver a constant supply of 100 psi air with practically no attention or maintenance. Their on-the-job dependability has become the standard by which all others are judged. And their rugged all-weather construction keeps them on the go under the most severe atmospheric and climatic conditions.

For information on how Gyro-Flo air power can help you speed up construction and avoid costly delays, just call your nearest Ingersoll-Rand representative.

The 900-cfm Gyro-Flo portable compressor shown in the foreground heads a line-up that includes four 600 cfm units, only the tops of which can be seen.

Line-hole foundation drilling, four holes to the foot, is being done with this quarry-bar setup using Ingersoll-Rand DB35 drifter drills on JHM Wagonjack mountings.

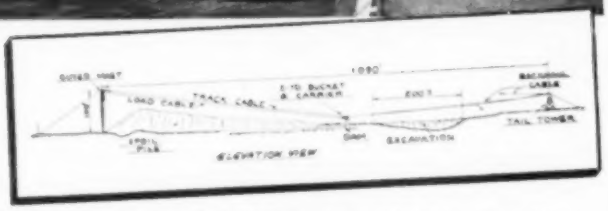
Ingersoll-Rand

2-727 11 Broadway, New York 4, N.Y.

AN UNBEATABLE COMBINATION... GYRO-FLO COMPRESSORS AND I-R ROCK DRILLS

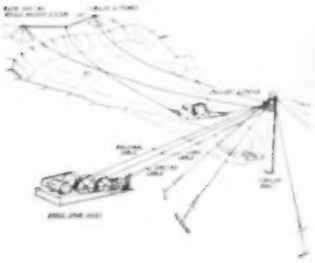
Three Sauerman Methods for Cutting Excavating and Reclamation Costs

DIGGING and CLEARING



Slackline Cableway—A 2-yd. bucket is used to maintain a clear channel to an irrigation project. The cableway digs the hard packed silt and conveys it to a spoil pile on the downstream side of the dam. Method permits removal of silt without wasting water.—*Sauerman News No. 146.*

RECLAMATION TO HOPPER



DragScraper—A 4-cu. yd. DragScraper digs sand and gravel from a wet pit and hauls it 400 ft. to grizzly hopper. This new machine handles increased plant demands in one shift. Two were required with the former installation.

—*Sauerman News No. 144.*

UNDERWATER TRENCHING

DragScraper and Crane—Here's how a DragScraper used with a carrier and track cable can extend the reach of any crane. This arrangement was highly successful in digging a trench for underwater pipe and backfilling after pipe was laid. —*Crane-DragScraper information is available in Field Report No. 228.*

Find out what the Sauerman Method can do for you

Give us details on your operation. Our engineers will give prompt recommendations and work with you to provide the best method for your requirements. Ask for Catalogs A (DragScrapers) and C (Slackline Cableways).

SAUERMAN BROS., INC.
622 SO. 28th AVE.
BELLWOOD, ILL.
Cable CABEX—Bellwood, Ill

Crescent Scrapers • Slackline and Toutline Cableways • Durolite Blocks

News . . .

Continued from page 48

of the Long Sault Canal. Total excavation had reached 13,077,000 cubic yards, which is more than 99% of the contract amount. The westerly end is finished.

Eisenhower Lock was nearly 90% complete, while Grasse River Lock was about 85% ready for the start of 14-ft. navigation this July through the Long Sault Canal.

All United States contracts for improvements to the South Cornwall channel remained on or ahead of schedule, and construction of training dike B was just about completed. The downstream approach to Grasse River Lock was nearly 25% completed. Section A of South Channel dredging, being preformed with government-owned equipment and hired labor, was nearly 34% complete. Section C, under contract to S. J. Groves & Sons, Minneapolis, Minn., was over 90% finished. Section D, under contract to Merritt-Chapman & Scott, New York, N. Y., was about 54% done.

Concrete placement on the New York half of the St. Lawrence power project had reached 1,916,000 cubic yards, 95% of the total required, according to the latest report of the New York State Power Authority and the Hydro-electric Power Commission of Ontario.

Concrete placement on the St. Lawrence Power Dam (Barnhart Island Powerhouse) continued on schedule. During November, 49,000 cubic yards were placed to bring the total to 912,000 cubic yards, 95% of the total required. Excavation in the tailrace was in progress. Installation of electrical facilities in the power plant and switchyard was moving at the expected pace.

At Long Sault Dam, placement of 16,400 cubic yards of concrete during November brought the total to 578,000 cubic yards, completing stage II concrete placement for the spillway apron, the roadway and the upstream crane girders. Final excavation and general cleanup of the stage II area were in progress.

At Iroquois Dam, removal of stage II cofferdams and cleanup of the construction area continued.

Contractors were active on channel improvement work at Sparrowhawk Point, Toussaints Island, Point Three Points and Ogden Island. Channel work on the entire power project is 93% complete.

where once the Romans mined
In the foothills of the Sierra Morenas in Spain, where once the Romans mined, the Tharsis Company produces sulphur and copper. In developing their opencast workings, the Company operates on a fleet of Aveling-Barford "SL" Heavy-duty dumpers for the removal of overburden and the transportation of ore. Ruggedly built and equipped with 150 B.H.P. diesel engine, four forward and four reverse speed transmission, two-way power-assisted steering and hydraulic tipping, the "SL" (9 cu. yd.) Dumper has everything that the tough hauling jobs demand.
For full details please send for List No. 1747/0.
• 9 cu yd CAPACITY
• 150 bhp DIESEL ENGINE
• TWO-WAY POWER-ASSISTED STEERING
• TWO-RAM HYDRAULIC TIPPING
• SPARES & SERVICE DISTRIBUTORS THROUGHOUT THE WORLD
AVELING-BARFORD
SL Dumpers
AVELING-BARFORD LIMITED GRANTHAM ENGLAND

Equipment You Ought to Know About

Crane Hooks

Manufacturer: Crosby-Laughlin Div., American Hoist & Derrick Co., Fort Wayne, Ind.

Claims: A new line of load rated Crosby-Laughlin hooks in sizes from ¼-ton through 150-ton capacities is now available.

The line offers higher capacity per size and each hook is unconditionally guaranteed against breakage. The hooks have their rated capacities stamped permanently on them to permit easier selection of a hook for a given job. In addition, this feature will help eliminate the danger of overloads due to carelessness.

Crosby-Laughlin hooks are forged in three materials. C-1030 forging steel, heat treated, provides capacities from ¾-ton through 100-ton. This line is also available, forged from AISI 4130 chrome moly forging steel, heat-treated, which provides higher capacities—without increasing hook size. These alloy steel hooks are available from 1-ton through 150-ton capacity. Bronze alloy hooks through 8-ton capacity are also offered.

These drop-forged, heat-treated steel hooks provide adequate static strength, yet will not be cold, brittle or "notch sensitive." They will take tremendous impact loads even at temperatures of zero or below. In addition, they are "fatigue" resistant. Notching caused by sharp loading devices or hairline cracks in the metal surface cannot develop and weaken the hook even with continuous operation; nor will these hooks crystallize and break.

Every hook in the new line has a drilled cam which is an integral part of the hook. At anytime during the life of the hook, a standard safety kit, consisting of latch, spring and pin, can be added to the hook to make it a safety hook. This cam in no way interferes with normal hook use.

Hydraulic Crane

Manufacturer: Bucyrus-Erie Co., South Milwaukee, Wis.

Claims: Capacity of the Bucyrus-Erie H-5 Hydrocrane has been boosted to 12 tons. The H-5, which mounts on a standard low-cost truck, formerly was rated at 10 tons.

Hydraulic horsepower of the H-5 has been increased by about one-third. Another complete hydraulic circuit has been added, giving the H-5 a total of three independent circuits.

Contributing to the increased crane capacity are a more powerful boom hoist, stronger outrigger boxes and high alloy steel in the hoist standards.

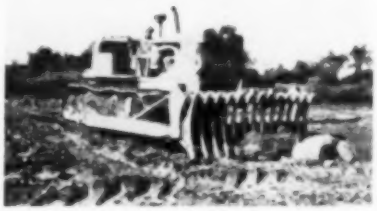
The addition of the third hydraulic unit provides faster coordination of crane movements while maintaining precision control. Each of the circuits is supplied by a separate pump. The pump drive now is gear-driven. It is enclosed and runs in oil for longer life.

Push button controlled selector valves allow diversion of oil to a needed area, doubling the speed of any movement while controlling other motions safely. Each circuit contains its own improved relief valve.

A new 12-volt electrical system is used in the H-5 to provide starts in all climates.

All the other H-5 features have been retained. These include the low-cost truck mounting, hydraulic telescoping boom, short tail swing, outriggers and open road speeds of up to 50 mph. The three-piece boom extends to 50 feet and retracts to 26 feet, providing less than 35 feet of overall truck length for travel.

Land-Clearing Rakes



Manufacturer: Rockland Allied Equipment Co., Department FF, 3778 W. Colonial Dr., Orlando, Fla.

Claims: Rockland is offering a new line of land clearing rakes which permit immediate adjustment or addition of teeth in the field.

The line includes a model RF-3 heavy-duty rock rake, a general purpose clearing rake, a brush and root rake and a stacking and piling rake.

Teeth on the model RF-3 are offered with a service life guarantee. Teeth on all other models are made of the same cast steel alloy, differing only in weight from the heavy-duty model.

According to Rockland, the new rakes prevent debris from becoming hung up between rake teeth, which can be a major cause of time loss in land clearing.

Low Silhouette Rear-Dump

Manufacturer: LeTourneau-Westinghouse Co., Peoria, Ill.

Claims: A new low silhouette version of the 11-ton model D Tournapull rear dump is specially designed for underground operation and other jobs where clearance and maneuverability are important. The unit's height is only 8 feet

Continued on page 54

New 11-B SWING CIRCLE *
helps cut costs to boost your Profits

Low friction, high loading capacity, low maintenance, and minimum play are cost-cutting advantages you get with the new ball bearing swing circle introduced on the new Bucyrus-Erie 11-B Transit Machine. This swing unit is a bench assembly. It is welded directly to the carrier and bolted on the underside of the revolving frame. Like other new bench assemblies in the simple, compact 11-B machine, it contributes to ease of maintenance and accessibility.

The new swing circle consists of upper and lower circles, clamp ring, and a double row of ball bearings. This arrangement helps distribute the loads between upper and lower works, eliminating the need for a center pintle or centering gudgeon. What's more, the unit is prelubricated and sealed at both top and bottom.

The swing circle is just one of many features that contribute to the outstanding performance of the 11-B. Ask for the complete story on this new money maker. See your nearby Bucyrus-Erie distributor *now!*

459E58C

* One of the important new 11-B features that can help make money for you.

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

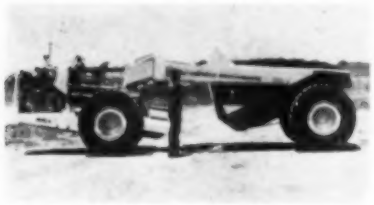
BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

New Equipment . . .

Continued from page 52

11 inches while hauling and 11 feet 8½ inches in dump position.

In addition to reduction in overall height, the new design incorporates a unique "squat" feature which permits lowering of the dump bowl to provide a loading height of only 65 inches—low enough to accommodate even the small tractor-mounted front-end loaders.



The "squatting" action is permitted by a simple two-position air valve control. At one control setting, a pair of air rams project simple mechanical lock bars which engage with stops on the rear dump bowl to hold the unit in travel position. At the other valve setting, the rams retract the lock bars from the stops and allow the bowl to move downward. The extreme of this travel is reached when the bottom of the bowl rests on the ground. At this point, load height of the unit is 5 feet 6 inches, or 19 inches less than the standard model D.

Raising and lowering of the bowl is accomplished by an electric motor. To protect the system and prevent cable breakage, limit switches have been synchronized with the lock bar action to automatically stop the motor at travel position and also when the bowl reaches maximum low level. In addition, a standard limit switch arrangement cuts power when the bowl is raised to the extreme dump angle.

Except for its ability to "squat" for loading, the low silhouette model retains the same basic operational features as the standard model D. It is 8 feet wide and maneuvers easily making complete 180° turns in less than its own length.

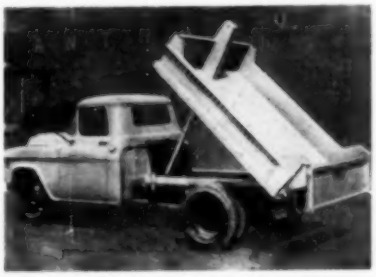
All-Purpose Dump Body

Manufacturer: Anthony Co., Department EE, Streator, Ill.

Claims: Anthony now offers an all-purpose dump body designed especially for 1-ton truck chassis. Called the "Yard Bird," the body has a 1½-cu. yd. capacity.

The hydraulic hoist is a single cylinder, telescopic head-lift type, with 61-in. stroke. Its high pressure cylinder has V-type packing and a 5-ton capacity. Pump reservoir and valve are in a single unit, driven by power take-off from truck transmission.

The body itself is made of 12-gauge steel and has gussets for adding sideboards. It is 8 feet long. Formed steel crossmembers and structural longitudinals give full support to the entire floor area.



The hoist, of weight-saving construction, gains more leverage from applying its power directly to the load and well ahead of load center. Because the hoist is forward mounted, more weight is distributed to the front of the truck. For these reasons, more payload may be carried on the back axle.

Thew Front-End Loader

Manufacturer: Thew Shovel Co., Lorain, Ohio.

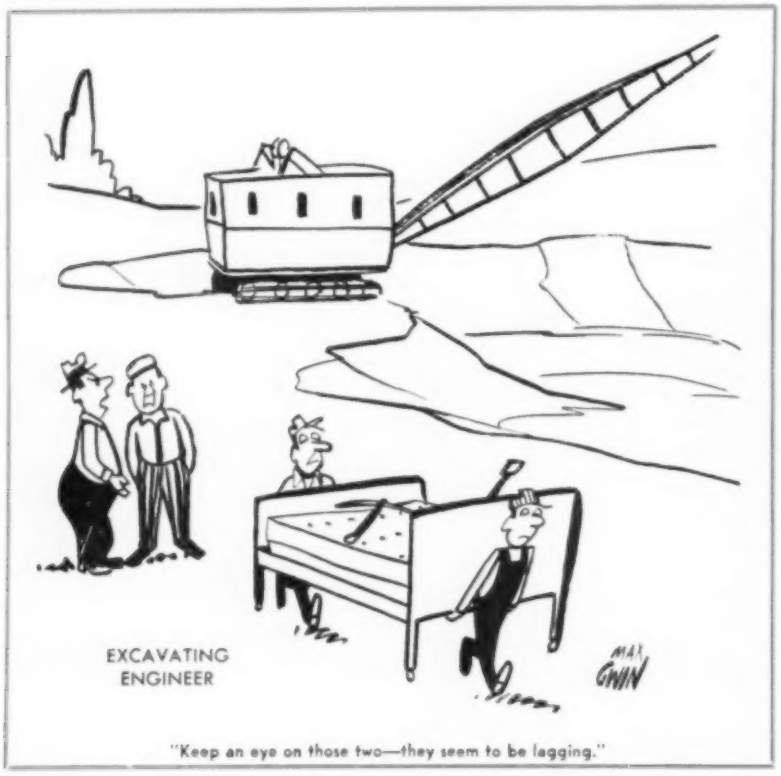
Claims: Thew has announced production of the first model of a new line of rubber-tired front-end loaders.

The name Moto-Loader has been given to the new product line and the first model announced is a four-wheel drive, 1¾-yd. capacity unit, designated Model ML-153.

The ML-153, available with either gasoline or diesel power, utilizes an Allison "Torqmatic," three-speed, power-shifted, full reversing transmission and integral torque converter with a 2.5 to 1 ratio. Top speed is 21.4 mph. Use of

the integral torque converter provides an infinite number of gear ratios in each speed range. Shifts can be made into any of the three operating ranges under full power. Planetary axles are used both front and rear.

A new concept for travel direction selection and throttle control is introduced on the new Moto-Loader. Two adjacent foot pedals—one for forward



"Keep an eye on those two—they seem to be lagging."

travel and one for reverse—give the operator instant direction control with one foot, while the other foot is used for braking. This frees both hands for steering and hoist and bucket controls, giving extreme ease of operation and precise control throughout the loading and digging cycle.

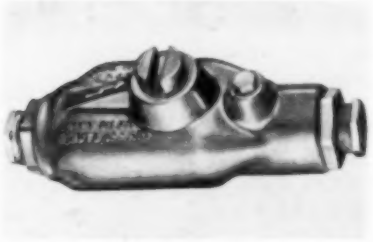
Under the forward-reverse foot pedals are additional accelerators, to provide travel speed control in either direction without removing the foot from the shifter pedals. These accelerators are used at the option of the operator, since there is a conventional foot accelerator in the normal position. Equalizing the forward-reverse pedals gives an additional neutral without hand shifting the transmission.

Bucket roll-back at carry position is 40°. Forward reach at 7-ft. dumping height is 40 inches. The peak lift capacity of the new Moto-Loader is 11,000 pounds at 0 mph; at 4 mph the carrying capacity is 6,000 pounds.

The weight of the gasoline powered unit is 18,900 pounds, and 19,600 pounds with diesel power. The gasoline engine is a Continental M-330 with 330-cu. in. displacement. The diesel engine is the Cummins JF-6-BI with 401-cu. in. displacement.

A line of easily-mounted front-end attachments is available.

Air Tool Shut-Off Device



Manufacturer: Le Roi Div., Westinghouse Air Brake Co., Department EE, Milwaukee 1, Wis.

Claims: A new automatic line oiler which shuts off the air supply when the oil is used up is now offered by Le Roi.

Lack of oil, the most prevalent cause of air tool damage, is eliminated by the new L0380, which is lightweight, easily adjusted and refillable while in use. The positive type oil-pickup feeds oil the instant drilling starts; the moment the oil supply is exhausted, the air supply to the air tool is shut off automatically. Its one-pint capacity is more than adequate for one shift of operation.

In addition to its automatic protec-

Continued on page 57

You can't set your sights too high

For digging . . . for handling material . . . for any clamshell work — OWEN Buckets perform giant size jobs day in and day out. OWEN'S designing and engineering experience, gained through 50 years of manufacturing Clamshell Buckets exclusively, has developed a product that is guaranteed to out-perform any other make. Remember—the bucket is the working end of the boom and it is of the utmost importance that there is absolute assurance the bucket will do the job.

This experienced "know-how" in design and engineering has contributed to the origination of the only independent tine action Grapple to handle rock, scrap metal or pulpwood. The same unequaled quality construction in OWEN Clamshell Buckets is in OWEN Grapples.

OWEN Engineers are at your service any time at no cost to you. Send us your needs, stating exactly what are your requirements. We should have the answer that will "fit the bill to a T".

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

BUCYRUS-ERIE ROTARIES Speed Blast Hole Drilling

A new drilling record was established at this large open pit coal mine in Indiana when the 50-R shown here was put into operation.

BUCYRUS-ERIE rotaries are increasing drilling footage at open pit mines everywhere. Their ability to put down hole fast results from an exclusive combination of features — variable drilling speed and variable down pressure.

For controlled speed, the Ward Leonard variable voltage system gives the operator smooth, instant command over rotation of the drill pipe. He can choose the most efficient speed for a given formation. To meet requirements, he can vary the speed without stopping the drilling operation.

In hard formations, maximum down pressure can be exerted on the bit while the drill pipe is turning slowly. This gives greatest possible penetration.

In soft formations, the operator can increase rotating speed substantially as he cuts down pressure. He can match pulldown force and rotation speed so tools do not advance faster than cuttings are removed. At the same time he keeps up enough air velocity to remove cuttings from the hole.

For the full story on Bucyrus-Erie rotaries, contact Bucyrus-Erie Company, South Milwaukee, Wis. Ask for illustrated bulletins on the 50-R (full-electric rig for drilling 9⅞ to 12¼-in. holes) and the 40-R (diesel or electric rig for drilling 6¾ to 9-in. holes).

71858C

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

New Equipment . . .

Continued from page 55

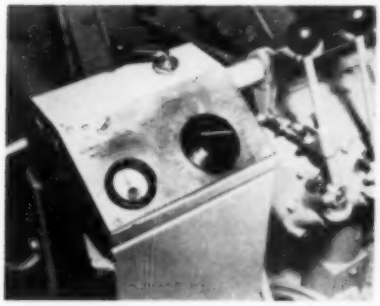
tion, the new oiler prevents the waste of excessive oiling due to inadequate adjustments of conventional line oilers. The new oiler can be refilled while in operation, thereby eliminating drilling interruptions. Oil flow, too, can be adjusted without shutting off air pressure.

Differential pressures are used to operate the automatic line oiler. Air is routed through the oiler to create a pressure on the inside of an oil-resistant bellows; this forces a regulated amount of oil through a porting, injecting oil into the air stream at the outlet end of the oiler. When the oil chamber is empty, the bellows activates the shut-off plunger, cutting off the air supply to the air tool.

The oiler body is made of aluminum, weighs nine pounds and is of streamlined design—making it easy to move air lines. Less than a foot in length, it is easy to incorporate into air lines or to mount onto compressors. Its top capacity is 300 cfm.

Steel inserts are used at the inlet and outlet air connections, the filler plug and the oil adjustment nut. It is easy to assemble or disassemble without special tools.

Automatic Blade Control



Manufacturer: Preco, Inc., Department EE, 6300 E. Slauson Ave., Los Angeles, Calif.

Claims: A new Preco automatic blade control made exclusively for Cat No. 12 motor graders automatically keeps the grader blade at any desired slope. Its accuracy has been demonstrated to within $\frac{1}{8}$-in. in 10 feet.

Because it is far more accurate than the human eye and faster than the hand, the Preco control permits an operator to finish a given grade in a single pass at higher speed and with extreme accuracy, when conditions enable the blade to carry all the surplus material. Finish grading can often be accomplished in less than half the time as compared with manual control of the grader.

It is equally useful and accurate for making finish bank cuts, sloping shoulders, working between forms for establishing sub-grades—virtually any blade position needed for normal grader operation.

With the device installed on the control panel of the motor grader, the operator simply dials the specified slope on the dial, which is calibrated in both percent of slope and slope ratio. The Preco unit automatically holds the blade to this position, regardless of the terrain and position of the grader frame.

Where manual operation is desired, the control can be overridden by the operator, or shut off completely. The unit is powered by the standard battery, and can be easily installed. It is sold and serviced by Caterpillar dealers.

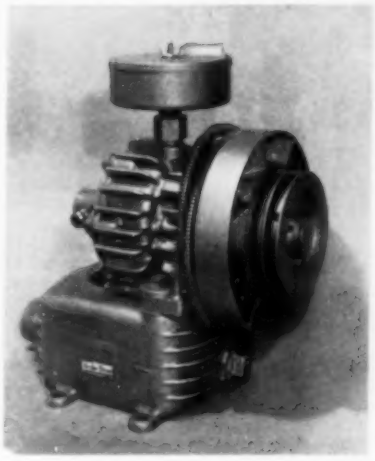
Utility Air Compressor

Manufacturer: Kellogg Div., Department EE, American Brake Shoe Co., 97 Humboldt St., Rochester 9, N. Y.

Claims: The Kellogg-American model R-1 is the first single-stage "sliding vane" rotary compressor offered in a small general utility size. It weighs only 55 pounds but has a rated output equal to that of a piston unit weighing more than twice as much.

Manufactured in $1\frac{1}{2}$ and 2-hp ranges, the model R-1 is recommended for general utility purposes, including applications in garages, service stations, machine shops and other operations.

The unique sliding vane principle of compression uses a rotor turning within an off-center housing. Compression up to 200 psi is attained as entering air trapped between the sliding vanes is moved into increasingly smaller space between rotor and housing. The vanes are held against the off-center housing by centrifugal force; oil in constant circulation seals the compressing components. Discharge air temperature runs to about 200° F—more than 100° cooler than discharge temperature for a comparable piston unit.



Features of the unit include a self-contained circulating oil system which both seals and lubricates. A filter system completely removes oil from compressed air and returns it to a sump; a cut-off switch prevents operation if oil level drops too low.

"Let it go, Miss Tilker! Let it go."

TerraTrac Grouser

Manufacturer: J. I. Case Co., Industrial Div., Department EE, Racine, Wis.

Claims: Case has announced a new-type of removable grouser which bolts onto the street shoes of TerraTrac crawler tractor-shovels.

Available for the new larger capacity $1\frac{1}{2}$ and 2-yd. models, the grousers improve traction in mud, sand or on steep slopes. A set of 10 grousers (five for each track) can be attached with an ordinary hand wrench in about 10 minutes. The grouser is of triangular design.

The new 80 and 100-hp TerraTrac tractor-shovels are able to use grousers

Continued on page 62

NOT in the Contract

An African chieftain flew to London for a visit and was met at the airport by newsmen. "Good morning, Chief," said one. "Did you have a comfortable flight?"

The chief made a series of raucous noises—oink, honk, screech, z-z-z. Then he added in perfect English, "Yes, very pleasant indeed."

"And how long do you plan to stay?" asked the reporter.

Prefacing his remarks with the same noises, the chief answered, "About three weeks, I think."

"Tell me, Chief," inquired the baffled reporter, "where did you learn to speak such flawless English?"

After the now standard oink, honk, screech, z-z-z, the chief replied, "Short wave radio."

First flier: "Quick, what do I do now, instructor?"

Second flier: "Good heavens! Aren't you the instructor?"

Over their coffee at the corner drug store, three stenos were considering what it would be like to be stranded with a man on a desert island.

"I'd want the man I was stranded with to be a good conversationalist," said the first.

The second said, "I'd rather mine were a good hunter and a talented cook."

The third thought a while and smiled, "I'd want to be with a damned good obstetrician."

The landlord was quizzing the prospective tenant. "You know," he said, "we keep it very quiet and orderly here. Do you have any children?"

"No."

"A piano, radio or victrola?"

"No."

"Do you play any musical instruments? Do you have a dog, cat, or parrot?"

"No, but my fountain pen scratches like hell sometimes."

A floorwalker tired of his job, gave it up and joined the police force. Several months later a friend asked him how he liked being a policeman.

"Well," he replied, "the pay and the hours are only fair, but one thing I like—the customer is always wrong."

One evening a young matron was returning from a first aid class, and she came upon a man sprawled face down on a darkened side street.

"Ah!" thought the girl, "Providence has led me hither to minister to this poor unfortunate." Parking her car nearby, she rushed over and began artificial respiration. Presently the man stirred, looked up, and speaking with difficulty, said: "I'm holding a lantern for a guy working down in this manhole. I ain't sure what you're up to, lady, but this ain't the time or the place."

The district attorney was questioning a Kentucky colonel in court. Unable to shake his testimony he tried sarcasm. "They call you colonel," he sneered. "In what regiment were you a colonel?"

"Well, it's like this," drawled the colonel. "The 'colonel' in front of my name is like the 'honorable' in front of yours. It doesn't mean a thing."

A young bride-to-be had been taking driving lessons in order to relieve her husband at the wheel on their honeymoon trip. In all the excitement of wedding preparations, however, she found time to get only a learner's permit.

Came the wedding and then the reception at the bride's home and the happy young couple departed in a shower of rice for their long trip. A few minutes later, the guests were startled to see the bride rush back into the house.

"Lucky we hadn't gone very far," she giggled breathlessly. "I forgot my learner's permit."

The drunk sitting at the bar was adjacent to a man and his wife. Suddenly the drunk came forth with a resounding burp.

"How dare you belch before my wife?" thundered the husband.

With that the drunk unsteadily got off the bar stool and making a sweeping bow said:

"A thousand pardons, sir. I did not know it was the madam's turn."

Husband (arriving home late): "Can't you guess where I've been?"

Wife: "I can, but go on with your story."

"I hope you like surprises!"

EXCLUSIVE CATERPILLAR "HI-ELECTRO" HARDENING MAKES STEEL TOUGH TO BREAK, HARD TO BEND

Result: New CAT Scraper and 'Dozer cutting edges, built to withstand increased demands of today's machines, are top buy.

The cutting edge of a bulldozer or scraper takes more punishment than any other part of the machine. And more punishment today than ever before. New, larger, more powerful machines make greater demands on cutting edges.

New Caterpillar cutting edges match the superb quality and performance of Caterpillar earthmoving equipment. They are built to stay on the most grueling jobs, day after day, without breaking or bending. There is no better buy at any price.

Field tests prove that the new Cat cutting edges not only outwear other make edges of the same thickness; they even outlast the thicker edges of other manufacturers.

To manufacture such tough edges, Caterpillar engineers perfected a hardening process to give steel the right blend of toughness and hardness—toughness to prevent breaking, hardness to prevent bending and rapid wear.

ROUGH JOBS like this put cutting edges to severe test. And here is where tough Caterpillar edges prove their superiority.

A quality edge starts with quality steel, tested in Caterpillar's laboratories for the right chemical composition and physical characteristics. Only steels meeting these exact specifications are accepted, and further tests are made at every stage of production.

Edges are heat treated by "Hi-Electro" hardening, a Caterpillar exclusive. This gives a deep, superhard wear case. The core is left tough. The finished edge has an armor-like case and a shock-absorbing core.

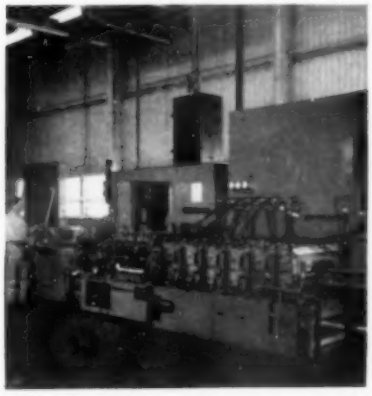
Your Caterpillar Dealer has full information about the new Cat Scraper and 'Dozer cutting edges. See him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CROSS SECTION of edge showing armor-like case and its shock-absorbing core.

CATERPILLAR

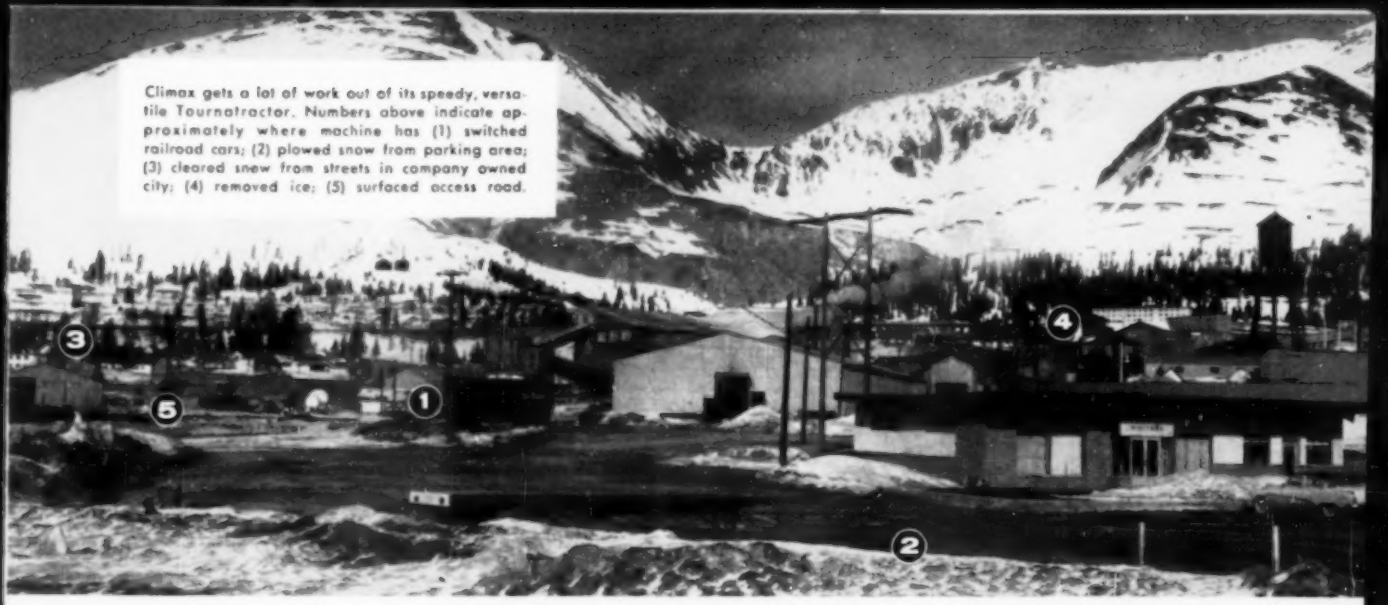
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



"HI-ELECTRO" hardening machines at the Caterpillar factory give cutting edges the strength to resist breaking and bending.

EX-LAFFS ON THE SHOWROOM FLOOR ..... by Marion Townsend

MR. WARNER IS IN CHARGE OF OUR STRIP PIT DEPARTMENT- I SELL BUCKETS.
ALL RIGHT, JACKSON. TURN OFF THAT SHAKE, RATTLE, AND ROLL RECORD WHILE I'M DEMONSTRATING TO A CUSTOMER!
THIS IS OUR NEW FOREIGN MODEL.
HOWS THAT ONE FEEL FOR SIZE?
DRAGLINE BUCKETS
OH, DEAR! LOOK AT THIS ONE, MERTLE. SOME CARELESS PERSON PUT THE BUCKET ON BACKWARDS.
SALESMAN'S LOCATION CHART
OFFICE
THIS SALESMAN SELLS UNDERWATER EQUIPMENT.
EXCAVATING ENGINEER


Climax gets a lot of work out of its speedy, versatile Tournatractor. Numbers above indicate approximately where machine has (1) switched railroad cars; (2) plowed snow from parking area; (3) cleared snow from streets in company owned city; (4) removed ice; (5) surfaced access road.
1
2
3
4
5

Why Climax Molybdenum Company switched to tractor-on-rubber at world's largest underground mine

High up on the Continental Divide in the Colorado Rockies, Climax Molybdenum Co. operates the world's largest underground mine. Its mountainside location — 11,320' above sea level — offers a tough test for the tractors Climax uses to maintain 22 miles of roads, and to service 150 acres of mine and surrounding area. Temperatures occasionally dip to 35° below zero; snowfall last winter measured over 30 feet.

Fastest, most powerful tractor in the Climax fleet is a LeTourneau-Westinghouse Tournatractor®, purchased in 1954 to replace a big crawler unit. The reason Climax switched to this speedy 210 hp rubber-tired tractor is explained by Supt. Burton Baumann:

"The snow and ice here make crawler upkeep just too expensive," he says. "A set of tracks lasts only 9 months. So we bought this rubber-tired Tournatractor to have a rig that would end that problem — that could work in snow without getting stuck, and would be dependable."

Tournatractor has met those requirements completely. After 3 years of service . . . during which time it has built and surfaced roads, worked on a tailings-pond dam, removed ice, switched railroad cars, and done a tremendous amount of snowplowing . . . Climax men say these things about it:

Supt. Baumann: "We *like* the tires as compared to crawlers. We used chains the first year, haven't used them since. Tournatractor can handle 95% of our tractor work, and its maintenance record has been excellent. Actually, with our preventive maintenance program — we try to catch little things before they become major problems — after 3 years, we still have had nearly 100% availability of our Tournatractor."

Ass't. Ray Lykins: "Tournatractor will plow as much snow as 3 crawlers, and leave the area clean. It's as fast as our truck plow, too. And on job-to-job travel, it takes only about 20 minutes to cover a distance that would take at least 45 minutes with a crawler. Cold weather starts are no problem at all."

Operator Bob Flowers: "It's a much easier-riding machine than a crawler — doesn't have near the jar. It's faster and easier to control. The cab is really warm, even in below zero temperature. Tournatractor is *very* easy to operate!"

Call or write for details on how 17 mph, 210 hp Tournatractor can solve varied tractor problems on your mining and exploration operations. No obligation.

During month of May — high up on mountainside Tournatractor clears remains of winter's 30' snow at Climax Molybdenum mine, Climax, Colorado. This big, rubber-tired workhorse "clears as much snow as 3 crawlers" according to mine officials. CT-1599.MJ-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.
OMAHA
DRAGLINE BUCKETS

New Equipment . . .

Continued from page 57

without danger of damage to the power train because they have a hydraulic torque converter drive which cushions shocks and automatically adjusts tractor speed to changing loads. The new grousers can be easily removed.

Portable Screening Plants

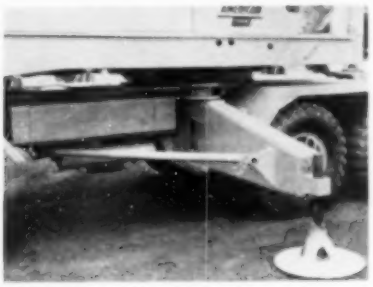
Manufacturer: Pioneer Engineering Div., Poor & Co., Inc., Department EE, Minneapolis 14, Minn.

Claims: Pioneer has designed two new low-cost portable aggregate screening plants for a high rate of production from any suitable materials. Designated models 366 and 488, the new plants consist of a single-deck buzzer screen and reciprocating plate feeder permanently mounted on a lattice frame conveyor installed on a hydraulic cradle truck. Model 366 is equipped with 3 x 6-ft. screen while the screen on the model 488 is 4 x 8-ft. Feeder and conveyor are matching.

On both models, the screen is pivot-mounted on the delivery end of the conveyor, allowing it to be easily swung to operating position or to be folded under the conveyor for transport. Hydraulic raising and lowering of the conveyor further simplifies setup and operation.

The ready portability of these plants permits on-the-spot production of large quantities of screened gravel, stone, coal, ore, black dirt and other materials. Since capital investment is low, these plants are ideal for starting up in business, or for adding to a business where extra screening or separating is required.

40-Ton Truck Crane



Manufacturer: American Hoist & Derrick Co., 635 S. Robert St., St. Paul 7, Minn.

Claims: An air-controlled, 40-ton capacity American truck crane features a new outrigger system that adds tons of extra capacity.

The new American 500 model is designed to strip easily and quickly for over highway travel. The outrigger system permits substantial weight reductions in the carrier while providing a solid, steady foundation at five points, for the crane upper works.

The system features extremely deep center sections that swing out from the carrier, rather than sliding out, and which are locked into position. These sections are located almost directly under the rotating base of the machine, thereby becoming a steadying factor for the over-the-side operation. Two outriggers at the rear and one at the front of the machine permit a full 360° swing with rated capacities.

Center outriggers, as well as rear and forward outriggers, are easily removed to reduce carrier weights for over the road travel.

The retractable high mast, with fleeting sheave on mast top axle for improved boom drum spooling, is raised and lowered by engine power. The crane can be operated with mast either raised or lowered.

A deep section boom with alloy steel chord angles and tubular lacing is offered with the truck crane. The sections

Continued on page 64

1. Fingertip electric controls

2. Point-of-action electric motors

3. Hinged body design . . . no frame, no springs

4. Big, multi-disc air brakes on all 4 wheels . . . selective brake control locks front or back wheels, or both

5. Interchangeable tires and wheels, front and rear

6. All-steel body . . . with tri-level bottom

7. Wide bowl, with low rear entry, makes loading easier, faster . . . with less spillage

Cut your pit costs

with high-production Tournapull® Rear-Dump haulers

Capable of high-production in all materials, with a minimum of maintenance, LeTourneau-Westinghouse Tournapulls with Rear-Dumps give you more for your money in productive hours worked . . . more in tons moved . . . at lower cost. Here's why!

Simplified construction

Rear-Dump construction is radically simplified from that of conventional haulers. In place of a foundation frame and body sub-frame, Tournapull prime-mover and trail unit are hitched together by means of a rugged, high, horizontal yoke. Yoke pivots horizontally on kingpin at front . . . then extends back along the sides of the bowl, where it is pivoted vertically just above and ahead of rear wheels.

Heavy-duty bowl resists shock, abrasion, and crushing damage of big chunk-rock dropped by excavator.

Big tires

There are no dual tire or mixed size problems. Big, single, low-pressure tires adequately absorb the shocks of rough off-road travel and shovel loading. Troublesome springs, spring hangers and tie-rods that require frequent maintenance and replacement are eliminated. Long-wearing tires are interchangeable all around . . . one spare serves an entire fleet.

2-wheel prime-mover

Front-wheel drive and kingpin-type steer further simplify Tournapull construction. A multitude of trouble-causing parts are eliminated. No longer must power be carried back to the rear through a long driveshaft . . . with its inherent bearing, universal joint, and lubricating problems. No longer is steering handled by small front wheels subject to misalignment from "bulldozing", as they try to get out of ruts. All compact machinery inside prime-mover case is readily accessible for quick adjustment, easy servicing.

Simple, safe dump action

A touch of electric switch on dashboard instantly activates point-of-action body-hoist motor. Entire dump is under power control — there is no free fall. There's no delay for hydraulic pressure build-up, no shock-loads — as with gravity dumping. You save on maintenance time, too, because there is no hoist maintenance to check . . . only a few places to inspect and lubricate.

For complete information

Find out how these savings can put money in *your* pocket. There are three LeTourneau-Westinghouse Rear-Dump sizes to fit your requirements, with 11, 22 and 35-ton capacities. Write for information.

R-1409-M-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

22-Ws Bring 2-Way Pay to O. L. Norman

Stepping from their usual task of water well drilling, two Bucyrus-Erie 22-Ws drill blast holes at a Tennessee quarry. They are putting down 6-in. holes to an average depth of 67½ feet, mostly through hard granite-type limestone.

Two of four 22-Ws owned by O. L. Norman & Son, Dickson, Tenn., they have his recommendation for use not only on blast holes but on a variety of well jobs — domestic, farm, industrial, irrigation, air conditioning, etc.

Like so many repeat owners of Bucyrus-Erie drills, this contractor has experienced the 22-W's ability to handle heavy tool strings for fast, efficient production in quarry work. On water well jobs, these versatile rigs have the spooling capacity needed to drill deep holes . . . the fast line speeds to assure "extra" profits.

Dependable, double-duty performance with Bucyrus-Erie 20-W and 22-W drills is worth checking. Write today for the complete story.

131W58

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

New Equipment . . .

Continued from page 62

are pin connected for quick assembly in the field.

Travel weight on the new American truck crane is spread over four axles of the mobile carrier. The carrier is available in both 10-ft. and 9-ft. widths, each with a comfortable cab providing exceptional vision on the road and job.

New type air controls provide pressure increases from smooth initial engagement to non-slipping full pressure at the extreme position of the valves.

Centrifugal Pumps

Manufacturer: Marlow Pumps Div., Bell & Gossett Co., Midland Park, N. J.

Claims: Marlow has introduced a new line of self-priming centrifugal pumps for construction and utility service. The units are available in two sizes. The 1½ AA1 is powered by a 6BFB Briggs & Stratton engine while the 2AA1 by a 8BFB recoil start engine. The pumps are designed to eliminate the need of a check valve. A self-lubricating, long-life "Remite" mechanical shaft seal eliminates leakage.

The new utility pumps incorporate a completely new, improved defuser priming system (patent pending) that permits rapid priming with a minimum of water in the pump case. A new type cover plate may be removed quickly for pump inspection. It has tapped holes for both vacuum and pressure gauges as well as a "drain" plug. Discharge outlet can be quickly changed to any one of three positions. A thumbscrew filler-plug, in the top of the pump, makes possible rapid filling of the case.

Base of the unit is designed to afford maximum flotation for the pump in soft or muddy ground. When used on a hard-road surface, rubber shock-mount feet may be added in a matter of seconds.

The complete 1½-in. pump weighs only 49¼ pounds, while the 2-in. unit tips the scales at only 52½ pounds. A hard-fitting handle, located at the center of balance, makes carrying easy.

30-Ton Rubber-Tire Roller

Manufacturer: Bros, Inc., Road Machinery Div., Department EE, 1057 10th Ave., S.E., Minneapolis 14, Minn.

Claims: A new 30-ton self-propelled rubber-tire roller for asphalt, base and subgrade compaction work is announced by Bros. Called the SP-730, this new roller on controlled tests in Ohio produced densities averaging from 101.5% to 103% on asphalt surfaces in one to two passes. This thorough, uniform compaction is of special importance because it prevents further densification and possible deterioration of surfaces under heavy traffic.

On base aggregate compaction tests, the roller obtained 95% densities in two passes.

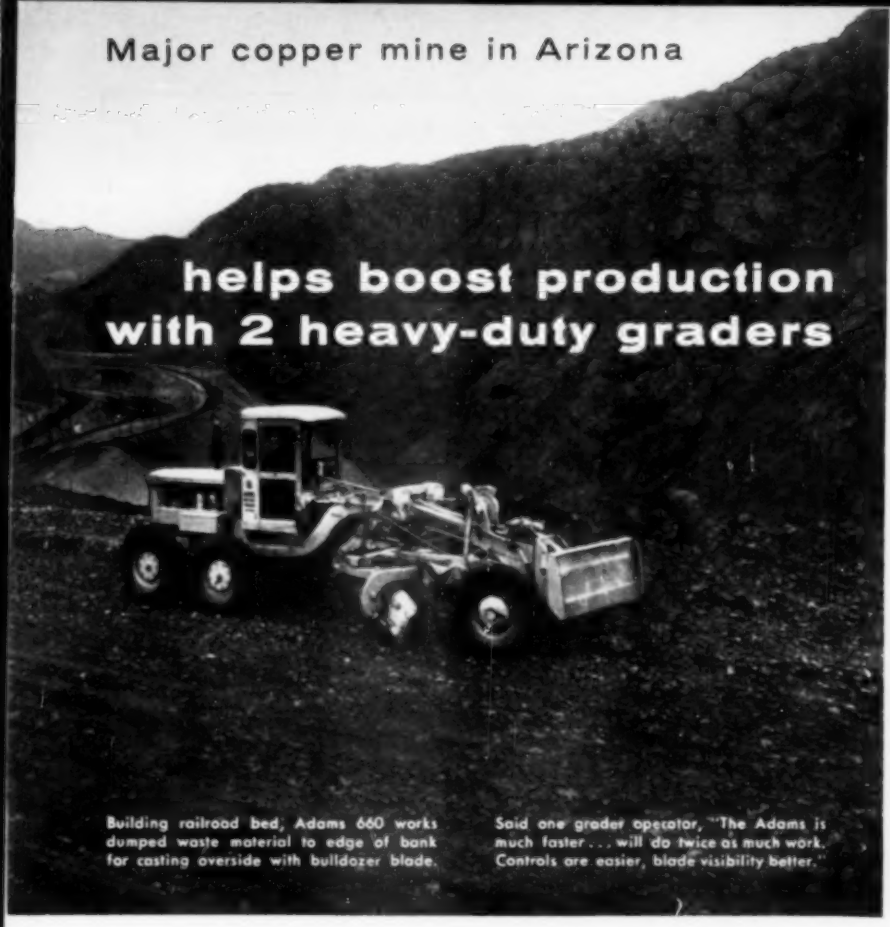
It is considered possible to change earthfill procedures by using the Bros SP-730 to compact lifts into a smooth course, thus allowing scrapers to travel in high gear over fill materials. In this manner, scrapers can speed up hauling and spreading of fill materials.

Design of this new roller features three wheels in front and four wheels in the rear, with full oscillation to provide even flow of compaction pressures. Rear wheel pairs have positive chain drive from power take-off.

The SP-730 is equipped with torque converter drive to provide smooth, even transmission of power to the drive wheels. It is powered by a 95-hp diesel engine which develops 1,800 rpm at operating speeds.

Major copper mine in Arizona

helps boost production with 2 heavy-duty graders



Building railroad bed, Adams 660 works dumped waste material to edge of bank for casting overside with bulldozer blade.

Said one grader operator, "The Adams is much faster . . . will do twice as much work. Controls are easier, blade visibility better."

At a large open-pit mine in Arizona, ore is mined at low levels and hauled by railroad cars . . . at higher levels, overburden is removed by a fleet of 35-ton trucks. To help these haulers travel at safe, profitable speeds, and to speed road and rail-spur construction — the mine uses two 150 hp Adams* 660 graders.

Patrols roads 24 hrs. a day, 6 days per week

One of the heavy-duty "660" LeTourneau-Westinghouse units is used primarily for maintaining many miles of haul roads. This fast-moving grader patrols these busy mine roads 24 hours a day, 6 days a week. It goes wherever needed . . . to fill ruts, level washboard, clear debris dropped by overloaded haulers and improve drainage.

For working along steep drop-offs, the Adams' standard blade extends a full 7½ ft. beyond wheel line, to give operator safe working margin. Extra-safe dual-braking system stops transmission as well as tandem drive-wheels for sure, safe stops and minimum brake wear.

Helps build new roads, RR grades

The second "660" grader — equipped with bulldozer blade — is used on new construction work and for maintaining waste dump. When constructing new roads or railroad beds, the "660" handles all the blade work.

Works any kind of material

Wide range of speeds give Adams advantage for working efficiently in any kind of material. All 80 to 150 hp Adams graders have an 8 forward and 4 reverse speed transmission. In addition, optional 3-speed "creeper" gears (0.23 to 1.82 mph) may be added. These low, full-power speeds move heavier loads, handle rocky material with greater speed and safety, insure more accurate blade control for fine finishing around forms or obstructions.

Adams' largest grader — the powerful 190 hp POWER-*Flow* 660, with torque converter — gives you an infinite number of speeds forward to 27.4 mph . . . reverse to 24.4 mph. Adams' smallest, the 60 hp "220", has 5 speeds forward to 18.3 mph — best in its class.

See Adams in action

Why not see how you, too, can step up mine and quarry production, cut operating costs — with heavy-duty Adams graders? There are 6 models: 190, 150, 123, 115, 80, 60 hp. Choice of GM or Cummins engines on 5 larger models. Call or write for a demonstration at your pit.

With dozer blade, "660" maintains waste dump. Over 72% of the total amount of material mined at this copper mine is waste.

Powerful "660" helps build exploration roads and RR road beds fast and easy. Commenting on the Adams grader, the second operator said, "I like the power and weight of the '660'. Also, the big 14-ft. moldboard and wide choice of speeds."

*Trademark G-1483-M-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

James M. Gerstley, president, is shown giving principal address at recent dedication ceremony of United States Borax & Chemical Corp. $18 million refinery and mine.

Borax . . .

Continued from page 27

hoist was driven through a 500-hp drive with hydraulic controls.

Maintenance, a very important feature of the underground operation, now is being transferred to the new open pit equipment. Actually, maintenance should now be easier. The continuous miners were complex machines with high performance motors, extensive hydraulic and electrical controls, and precision heavy-duty gear trains, pumps, bearings and chain conveyors crowded into a small space. They were maintained together with the ore handling equipment by electrical and mechanical crews operating in and from a completely equipped underground shop. The shop had facilities for grinding bits and splicing cable, a machine shop, a welding shop, a parts warehouse, electric shop and oil and grease storage, all equipped with overhead crane. There was telephone communication to all machines and to the surface.

The mine shop will now be moved up from underground and housed in a 50 x 200-ft. concrete and steel building equipped with a 10-ton overhead crane. The same high-type preventive maintenance will govern all new equipment.

Thus, in one ambitious stroke, Pacific Coast Borax modernized what was already a good underground mining setup to meet whatever demands are imposed by the rapidly developing nuclear age. From present indications these demands seem nothing short of fantastic.

Current field operations are under the general supervision of Walt Diffley, who is assisted by Jack Young, refinery superintendent. Bill Wamsley is mine superintendent; R. E. Kendall, pit superintendent; Biff Smith, assistant pit superintendent; and Pete Conte, drilling superintendent.

About Those 20-Mule Teams

The "20-Mule Teams" of song and fable actually were one of the most efficient links in the borax mining process. Conceived in 1885 as the only method of hauling the ore from Death Valley to Mojave across a blistering desert, they worked long and faithfully. Actually, 20-mule teams consisted of 18 mules and two good lead horses.

The ore wagons were mechanical marvels. They had 7-ft. high rear wheels, 5-ft. front wheels and steel tires eight inches wide and one inch thick. The wheel hubs were 18 inches in diameter and 22 inches long, with split oak spokes 5½ inches wide at the hub and four inches wide at their point. Axle trees of 3½-in. solid steel square bar were designed to take all pull and shock. The wagon beds were 16 feet long, four feet wide and six feet deep. The wagons weighed 7,800 pounds empty and 21,800 pounds loaded. Two loaded wagons plus a 1,200-gallon water tank made a 36½-ton payload. The wagons cost $900 each.

Two eras meet as a famed 20-mule team plods past a jet plane. Similar to those used in early mining days, mule team was specially reassembled for program marking beginning of full-scale open pit mining operations. The aircraft also took part.

Marion 111-M Does Double Duty

A Marion 111-M is "doing a good job on two jobs" at a Texas sand and gravel plant.

Half of its job is to handle the stripping to keep the sand and gravel bank uncovered.

Then it handles all of the loading for a plant that is working two shifts to keep pace with expanded operations.

The Marion 111-M is equipped with a 5-yard bucket on a 90-foot boom, making it one of the biggest machines in this type of work in the Texas area.

The 111-M is a diesel machine, capable of traveling and working almost anywhere. It combines all of the advantages of a diesel machine with the smooth, fast swing action of Ward-Leonard electric control. The diesel power unit drives a generator for the electric swing motors; there are no swing clutches to overheat and no complicated maintenance problem.

Get the complete story on the Marion 111-M and the tough jobs it is handling throughout the world. Your nearest Marion Distributor is the man to see.

MACHINE	Shovel Capacity	AVAILABLE AS . . .			
		Hoe	Crawler Crane	Truck Crane	Special Crane
35-M	$\frac{3}{4}$	Yes	Yes	Yes	—
43-M	1	Yes	Yes	Yes	—
362	$1\frac{1}{2}$	Yes	Yes	—	Yes
87-M	—	—	—	Yes	—
93-M	$2\frac{1}{2}$	Yes	Yes	—	Yes
101-M	3	—	Yes	—	—
111-M	4	—	Yes	—	—

MARION **POWER SHOVEL COMPANY**

A Division of Universal Marion Corporation

Marion, Ohio

SEND ME information about **MARION** ..... yard shovels, ... yard hoes and ..... ton cranes (☐ crawler mounted ☐ truck mounted). ☐ Have a salesman call.

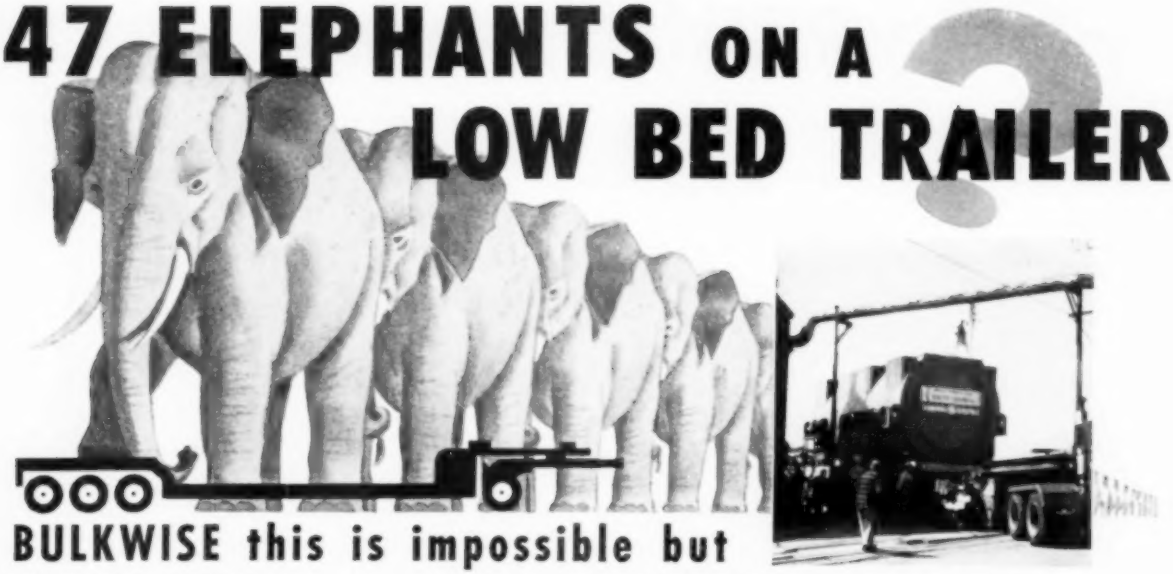
NAME ..... TITLE .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

47 ELEPHANTS ON A LOW BED TRAILER



BULKWISE this is impossible but WEIGHTWISE a comparable load has been hauled on a ROGERS TRAILER

Consider, for example, the feat of Roger Sherman Transfer Co. of East Hartford, Connecticut, in moving this exceptionally heavy generator component on a 32-wheel Rogers Trailer.

This General Electric stator was moved over 600 circuitous miles by rail, water and roadway, being finally transferred from dockside to the Boston Edison plant at Everett, Mass., by trailer.

Weighing 467,000 pounds, equivalent to a herd of 47 elephants, the stator was said to be the heaviest single piece of equipment ever to enter Boston Harbor.

Ingeniously planning the difficult operation, Roger Sherman specialists used 25,000 feet of lumber to protect dock and roadway from damage.

Since the pioneer days of their development Rogers Trailers have been the popular choice of leading riggers because of their rugged dependability, safety of operation, maneuverability and long life under difficult conditions.

PACKY SAYS: *"How many of us would be required to haul such tremendous weight? I give up!"*

ROGERS BROTHERS CORPORATION, Albion, Pa.

Export Office: 50 Church St., New York 7, N. Y., U. S. A.—Cable Address: Brosites

New Trade Literature

Subject: **Truck-Mixers**

Content: A preventive maintenance chart for concrete truck mixers explains how to cut down repair costs. Sixteen maintenance points from hold-down bolts to water pumps are outlined. The chart is designed to be displayed on garage walls and in other places where the operator's attention will be readily called to both periodic and daily maintenance practices. Ask for bulletin G-2486 P.

Where to get: Worthington Corp., Advertising & Sales Promotion Dept., Harrison, N. J.

Subject: **Cat Tractor Guide**

Content: Good machine performance can usually be traced to proper operator care is the theme of a maintenance guide discussing Caterpillar D7, D8 and D9 tractors. The 24-page guide has more than 75 full color drawings of helpful hints for obtaining optimum service life from Caterpillar-built equipment. Methods of preventing abnormal track wear are discussed in detail. Instructions for maintenance of seals, proper track adjustment and lubrication are illustrated. Specific directions show operators how to keep steering clutches, hydraulic boosters, control levers and brake components in best working order. Emphasis is placed on the correct adjustment of oil-type flywheel clutches and control lever operation. The guide discusses the importance of additive oils, use of the service meter, the use of filter elements and proper methods for lubricating track rollers and idlers. Service of tractor cooling systems is shown. Cartoons and drawings illustrate techniques used for cleaning radiator cores, flushing cooling systems, using anti-freeze and keeping fan belts in proper adjustment. A list of general facts are given for starting and stopping tractors, purchase of fuels, stopping the diesel engine, working adjustments and daily care. Rebuilding recommendations for worn pistons, idlers, links, rollers and sprockets are given. Also

discussed is the rotation for optimum wear of track components. Copies of the guide are available in English, French, German, Spanish and Portuguese. Ask for Form No. 32395.

Where to get: Caterpillar dealers or Advertising Div., Caterpillar Tractor Co., Peoria, Ill.

Subject: **Wire Rope Selection**

Content: *The Correct Wire Rope for Contractor's Equipment* is an eight-page Macwhyte bulletin which prescribes the proper type and size wire rope for various machine functions of shovels, cranes, dragline and clamshells; bulldozers and carry-type scrapers; cableway excavators; and contractors' hoists and derricks. It explains the strength, abrasion and flexibility requirements of wire rope and discusses the advantages and disadvantages of Lang Lay versus Regular Lay rope. Ask for bulletin 5702.

Where to get: Advertising Manager, Macwhyte Co., Kenosha, Wis.

Subject: **35-Ton Mobile Crane**

Content: An 8-page catalog describes the new Lorain Moto-Crane model MC-30. The crane is mounted on a narrow gauge carrier 108 inches wide and has a lifting capacity of 35 tons. Among the features listed are "Shear-Ball" mounting that eliminates all turntable rollers, center pins and centering gudgeons; a 35-ft. pin-connected boom of alloy steel; a three-position turntable mounting for maximum efficiency when used either as a heavy-duty crane, general purpose crane, or for shovel, hoe and dragline service; and removable counterweight, front and rear outrigger boxes and beams that reduce the overall weight of the vehicle for highway travel.

Where to get: Thew Shovel Co., Lorain, Ohio.

Subject: **Welding Techniques**

Content: *How to Get Better Welds* is a new revised edition of the welders' vest pocket guide containing 60 pages of useful arc welding information. The booklet gives information on metals and electrodes, four essentials of proper welding procedures, the fillet weld, types of joints, typical welding positions, welding symbols, standard steel shapes available for welding, causes of common welding troubles and what to do about them. Ask for booklet EW-201.

Where to get: Hobart Bros. Co., Department EE, Troy, Ohio.

IT DUMPS *faster*

...Because of the CLAM SHELL Design

It's a fact! KIESLER BUCKETS dump faster than all others! Actually tested and proven up to a full 40% faster dumping action! Kiesler's superiority lies in the exclusive full-scoop, Clam Shell design. ONLY Kiesler Buckets apply leverage to BOTH shells at the same time for double the digging force, and ONLY Kiesler has a more positive dumping angle than on other buckets. As a result, the Kiesler Bucket digs deeper taking a full pay load every time, and dumping begins the very second the jaws start to open.

Production and profits boom, thanks to this Clam Shell design. Your operators don't ever have to wait for the jaws of the bucket to be fully open before dumping begins. Consequently, they can handle many more loads in the same time as before. Dumping is also better controlled.

Whatever the material you're working with . . . coal, rock, slag, crushed stone, sand . . . KIESLER has the bucket for your excavating or rehandling work. More than 65 years of experience in manufacturing buckets, you can rely on for maintenance-free, profitable use. Write for details.

SOLID GRAB ASSURED BY KIESLER'S ICE TONG PRINCIPLE

Ice Tong Principle

GUARANTEE

Kiesler Buckets are guaranteed to outperform and do a bigger day's work than any other Bucket of equal weight, width and size, when properly reeved and operated.

JOS. F. KIESLER CO

Since 1892

944 W. HURON ST. • CHICAGO 22, ILL. • MOnroe 6-7144

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

7-yd. P&H walker perfect condition. New bucket.

SERODINO, INC.
8126 Vine St. Cincinnati, Ohio
VAlley 1-3161

Bucyrus-Erie Model 5-W Diesel dragline, 100' boom, 25' insert extension. Fairbanks-Morse main engine, auxiliary 100 HP Cummins for swing generator, includes two (2) Esco buckets, one five yard and one six yard. Owner using machine and it can be inspected in actual operation, very good operating condition, located in Northern Illinois. Price including buckets and approximately $5000 worth of spares, $60,000 as is.
Box 3716

Bucyrus-Erie 120-B dragline, 100' boom with gantry mast, 4' tracks, A-1 condition, located northern California. For sale or lease.

THURMAN & WRIGHT
625 Market Street San Francisco, Calif.

Used Bucyrus-Erie, class 175-B electric, dragline excavator tractor mounted with mats, 125' boom, 5-yd. medium weight bucket, power supply, three-phase 60-cycle, 2300-volt, including 1000' power cable, southern location, price reasonable. For further details consult P. O. Box 3728

2-W Monighan Walking-Type Dragline #492, 85' boom, 2-year old D-13000 Caterpillar diesel engine #4S685, 2-yard Hendrix bucket, 2½ yard Page bucket, some spare parts, fair operating condition.
Box 3708

SMALL SHOVELS, CRANES, DRAGLINES—UP TO 2½ YDS.

EXCAVATORS AVAILABLE FOR RENT OR PURCHASE

1—Bucyrus-Erie 15-B dragline with 30' boom and fairlead. With Waukesha gasoline power unit. Tracks and machine in good general condition. Ser. #29742.

1—Bucyrus-Erie 15-B comb. 40-10 dragshovel solid type with 34" blade type side cutters. Powered with a Caterpillar D-315 diesel engine and the machine is equipped with the following: Unit 51-A electric starting; Unit 74 Caterpillar mounting, long frame and 24" wide tread. Serial #109496—new in 1953. REPAIRED, CLEANED AND PAINTED. IN EXCELLENT CONDITION.

1—Bucyrus-Erie 1952 H-3 Hydrocrane mounted on a Ford F-6 truck with heater. Truck and tires in good condition. This machine is equipped with: Unit #1 operator's cab; Unit #192, differential lock; Unit #104-C 2-speed rear axle; recirculating heater; ¾ cu. yd. bucket, tagline, reel, complete crane equipment; telescopic boom from 18' to 26'; unit H.E.O. hoe equipment with 18" wide dipper; 2½ dia. hoist ram #9404-D Sprag UNIT OVERHAULED, CLEANED, PAINTED AND IS IN EXCELLENT CONDITION.

1—Northwest model 25—¾-yd. shovel with Kohler model #E light plant. Powered by Buda 468 diesel power unit. Ser. #10705. Machine new in 1948. Everything except the engine was overhauled by the former owner about a year before it was traded. Can be put right to work.

Write or Call: Jim Perkins
WM. H. ZIEGLER CO., INC.
2929 University Ave., S.E.
Minneapolis 14, Minn.
FRanklin 1-7971

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 22-B dragshovel; w/Model K-428 Buda engine w/electric start; ¾ cu. yd. bucket; serial #73221. Reconditioned. Buffalo, N. Y.

Model 310 General power shovel w/¾ yd. 37" wide bucket; powered by Model 525 Buda engine; serial #2987; year 1950. Reconditioned. Rochester, N. Y.

Lima model 34 backhoe; ¾ yd. bucket; crawler type; 20' cambered boom; GMC 3055-C diesel engine; serial #326916; year 1951. Reconditioned. Rochester, N. Y.

Loram model TL-25 shovel combination ¾ yd. shovel and 36" backhoe; crawler type; Cat D-318 diesel engine; serial #19711; year 1950. Reconditioned. Buffalo, N. Y.

Model 175 ADW Michigan loader; 16.00 tires; w/135 DKB Waukesha diesel engine; glass enclosed cab; 97" bucket; serial #18121 D; year 1956. Reconditioned. Buffalo, New York.

Tristan LC-100 loadster; serial #C-112; year 1952; IHC S240 engine; torque converter; 87" bucket. Reconditioned. Buffalo, New York.

All equipment f.o.b. location.

DOW & COMPANY, INC.
1820 Elmwood Ave. Buffalo 7, N. Y.
Branch
3240 Monroe Ave. Rochester 18, N. Y.

54-B Bucyrus-Erie 2½ cu. yd. shovel with Cummins diesel engine and torque converter, 36" wide treads. Serial No. 118053. Machine like new. Used under 900 hours.

Model 25 Northwest diesel shovel, long tracks, Murphy engine, 2-speed travel; located near Seattle.

Model 25 Northwest diesel shovel and pull shovel, GMC diesel engine; located in Seattle.

38-B Bucyrus-Erie 1½ cu. yd. shovel with Caterpillar diesel engine; located near Seattle.

CLYDE EQUIPMENT CO.
3410 First Ave., S. Seattle 4, Wash.

TRACTORS

Allis-Chalmers HD5B, serial #2784, diesel tractor w/hydraulic bulldozer with guarantee $3,800

Allis-Chalmers HD10G, serial #1577, diesel tractor w Tracto-Loader with guarantee $9,250

Allis-Chalmers HD15G, serial #1608, diesel tractor w/Tracto-Loader with guarantee $22,500

Caterpillar D4, serial #7U 19700, diesel tractor w/Traxcavator hydraulic loader with guarantee. Price $8,750

TRUCK CRANES

P&H 155, serial #7444, combination crane and backhoe w/35' boom and dolly—in good condition $9,500

Wayne 22, serial #830, Wagon crane and shovel 9-ton capacity in good condition $9,500

CRAWLER MACHINES

Bucyrus-Erie 10-B, serial #55159, dragline complete w/bucket and fairlead—in good condition. Price $4,500

Bucyrus-Erie 15-B serial #27617 dragline completely overhauled with guarantee $8,250

WEST COAST ENGINE & EQUIPMENT CO.
1081 Eastshore Highway
Berkeley, California
Phone: LA 5-2261

22-B Bucyrus-Erie shovel, serial 112207, with Cat D318 power, completely overhauled and in excellent condition $15,000

22-B shovel, serial 59097, with 371 GM diesel power unit, good operating condition $12,000

15-B Bucyrus-Erie dragline, serial 67656, with Buda gas power, complete with ¾-yd. Hendrix dragline bucket $7,800

10-B Bucyrus-Erie dragline, serial 15431 $2,500

Model L-50 Lorain Shovel, 1-yd. with Cat D318 power, in very good operating condition $15,000

¾ yd. Model 33M Marion heavy-duty dragline, serial 8669 with GM 371 power $14,000

JAMES W. BELL CO., INC.
1220 1 Ave., N. E. P. O. Box 550
Cedar Rapids, Iowa

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

EQUIPMENT FOR SALE

2400 Lima Dragline, 130', 5 yard.
4500 Manitowoc Drag, 120', 3 yard.
111-M Marion Drag, 100', 4 yard.
1055 P&H Dragline, 100', 3½ yard.
K-595 Link Belt Drag, 85', 3 yard.
54-B Bucyrus-Erie Drag, 80', 2½ yard.
40-A Marion Dragline, 90', 2½ yard.
903 Osgood Dragline, 70', 2 yard.
170-B Bucyrus-Erie 4½ yd. Elec. Shovel.
120-B Bucyrus-Erie 4 yd. Elec. Shovel.
88-B Bucyrus-Erie 4 yd. Standard Shovel.
1055 P&H 3½ yd. Standard Shovel.
80-B Northwest 2½ yd. Standard Shovel.
51-B Bucyrus-Erie 2 yd. Standard Shovel.
38-B Bucyrus-Erie Comb. Shovel Crane.
#6 Northwest 1½ yard Shovel.
Unit 1020 ¾ yard Shovel.
Also, various smaller Shovels & Drags.
Truck Cranes—P&H, Link Belt, Bay City.
400 Reich Truck Mounted Rotary Air Drill.
600 Reich Heavy Truck Mounted Rotary Air Drill.
Euclid Trucks—Rear & Bottom Dump.
Shovel, Drag, Crane & Backhoe Attach. Drag & Dipper Buckets for most makes & models.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

FOR SALE
BUCYRUS-ERIE
Model 54-B Shovel

Serial #20035, 2½ C.Y. digging bucket; also a 60' crane boom. Powered by Buda-Lanova nDH1742 diesel engine. Condition good. Located Downsville, N. Y.

BIANCHI, CENTRAL
MUNROE-LANGSTROTH, RUGO
24 Union Avenue
Framingham (Trinity 2-4341) Mass.

Caterpillar D8 diesel tractor s/n 13A2914 with Cat No. 25 cable control unit s/n 9D1995; Cat 8S (straight) dozer and lights.
BONDED BUY $22,000

Caterpillar D7 Traxcavator s/n 5T7260—front mounted cable loader 2½ cu. yd. capacity. HIGH PRODUCTION MACHINE. Excellent condition $10,000

Allis-Chalmers HD19H diesel tractor (twin disc) torque converter s/n 2919 with cable control unit, push plate, rock guards.
GOOD $5,500

Northwest Model 25 crane s/n 3054 with GMC 371 diesel engine s/n 3D19531 with ¾ cu. yd. clamshell, ¾ digging clam dragline, ¾ dragline bucket, 65' boom, Rud-O-Matic tagline, revolving fair leads and 28" treads. This crane is in excellent condition with slightly over 2000 hours $17,500

Oehlert Tractor & Equipment Co., Inc.
Phone: TAylor 3-4661 Salina, Kansas

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

1—1957 Bucyrus-Erie Model 22-B backhoe with Cat diesel engine.
1—¾ General backhoe with gas engine in fair condition, priced right.
1—Bucyrus-Erie 38-B 1½ yd. shovel, Cat D1300 engine, with extra 80' dragline and clamshell boom, in excellent condition.
1—1952 Shield Bantam crawler backhoe, rebuilt in 1956. Real bargain.
1—1957 Allis-Chalmers Model 45 motor grader complete with scarifier, hydraulic shittable moldboard.
1—1957 Bucyrus-Erie 30-B combination dragline and clamshell, 50' boom with pendant suspension, Cat diesel power, rudomatic tagline, used three months.
1—Rebuilt and guaranteed Allis-Chalmers model HD19G.
1—Multifoote model 34E single drum paver, excellent condition.
1—Trackmotive model TL-12 Tracto-loader, good condition.
1—Blaw-Knox model PF90 bituminous paver, in very excellent condition, used as a demonstrator. Real buy.

D. D. KENNEDY, INC.
P. O. Box 177 — Bellwood, Ill.
ATlantic 7-4300 — LInden 4-5600

One Bucyrus-Erie Model 41-B, 3 motor AC electric shovel, serial no. 10796, 1½ yd. dipper, cat-mounted, 26" treads, 22'6" boom, 15' handle, good operating condition. Many replacement parts for swing and crowd machinery recently installed or available. Located Mid-West.

One Bucyrus-Erie Model 52-B Ward-Leonard electric shovel, serial no. 11395, equipped for 1 phase, 60 cycle, 440 volt operation; 2¼ cubic yard dipper, 30' boom, 18' handle, equipped with power boom hoist and electric light plant. Well maintained and in good operating condition. Caterpillar units recently overhauled. Located Mid-West. Box 3710

Bucyrus-Erie 15-B dragline excavator with 30' boom, Cat. diesel engine with electric starter, unit 76 tractor type crawler mounting with 20" wide grousers, unit 7½ counterweight. Machine serial #115288. Price f.o.b. Greensboro, N. C. $18,500

Used 10 x 42 Pioneer jaw crusher, complete with grooved flywheel for 10D-240 V-belts (10), serial #U-2036. Price f.o.b. Greensboro, N. C. $14,250

Used Allis-Chalmers TS-300 motor scraper with Buda diesel engine, serial #729. Price f.o.b. Greensboro, N. C. $10,000

Northwest 25 comb. dragline, clamshell machine with GM diesel engine, serial #14941. Price f.o.b. Greenville, N. C. $12,000

E. F. CRAVEN COMPANY
Greensboro, N. C.

¾ yd. Lima Model 34 dragshovel powered with Cummins diesel engine, 30" crawlers, good condition.

1¼-yd. Bucyrus-Erie Model 33-B crane-clam combination, 70-ft. boom, independent boom hoist, gas power, very good condition.

2-yd. Loram Model 820 crane-clam-dragline combination with Cat. D-13000 diesel, swamp cats, fairlead, pressure lubrication—excellent condition.

¾ yd. Model 55-TC P&H Mid-Mite crane-hoe combination mounted on 6 x 6 crane carrier—very good condition.

2-yd. Loram Model 82 crane-shovel-dragline combination, 70' boom, like-new shovel attachment, Cat. D-13000 diesel engine, std. crawlers.

¾ yd. Lima Model 34 dragshovel, gas power, standard crawlers, good condition.

¾ yd. Model H-3 Bucyrus-Erie Hydrocrane 1955 mounted on GMC truck, with operator's cab, tagline reel, clam bucket—very good condition.

¾ yd. Model H-3 Bucyrus-Erie Hydrocrane 1954 mounted on IHC L-160 truck, remote control, operator's cab, tagline reel, ¾ yd. clamshell bucket—very good condition.

¾-yd. Model H-3 Hydrohoe attachment with wrist action dipper to fit either of the above Hydrocranes.

¼-yd. Model H-2 Hydrocrane with tagline reel (less bucket). Complete machine in very good condition—3 new style pumps.

¾ yd. Model 22-B shovel attachment in very good condition. Priced right for quick sale.

J. P. WAITE, INC.
3304 W. Pierce St. — P. O. Box 513
Milwaukee 1, Wis.

Model LS75 Link-Belt ¾ yd. machine with shovel front and backhoe, yr. 1948, 20" pads, gas engine, completely reconditioned.
F.o.b. Buffalo, N. Y. $7,500

SYRACUSE SUPPLY COMPANY
294 Ainsley Drive — Syracuse 5, N. Y.
Phone: GRanite 8-3152
Branches: Rochester and Buffalo

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

CRAWLER SHOVELS

Lima model 802, 2-yd. shovel with 36" pads, air controls, powered by a Cat D17000 diesel engine, with electric starter. Thoroughly rebuilt. Ask for detailed list of replacement parts, as installed.
Guaranteed $38,500

Loram model LS20, 2-yd. combination crane, clamshell and dragline, 50' boom, rudomatic tagline and fairlead, 35" pads, Waukesha diesel engine.
Subject to inspection $20,000

Bucyrus-Erie model 15-B hoe, ¾-yd. powered by a Waukesha model HP526 gasoline engine with electric starter.
Good condition $7,000

P & H model 255A backhoe, ¾-yd. 26" tracks. Diesel engine, reconditioned $16,500

TRUCK CRANES

Loram Moto-Crane model L41, 20 ton capacity, 40' boom, outriggers and screw jacks; mounted on standard factory carrier, 11:00 x 20-12 ply tires.
Good operating condition $18,000

Lima Paymaster truck crane, type E34, ¾-yd. 35' boom, powered by 6-cylinder Buda gas engine, mounted on Brockway 6 x 6 truck carrier with ten 12.00 x 24 tires.
Reconditioned $13,000

TRACTORS

Caterpillar D6, diesel tractor, with Cat 6S straight hydraulic bulldozer and No. 46 hydraulic control.
Reconditioned—Certified buy $9,250

Caterpillar D4 diesel tractor, 137" tracks with Cat 4S straight hydraulic bulldozer and #44 hydraulic control.
Good operating condition $3,750

Allis-Chalmers HD20W diesel tractor w/ Garwood bulldozer and DD. P.C.U. Good operating condition.
Undercarriage reconditioned $16,000

Caterpillar D8 diesel tractor, with Hi-Output engine, Cat 8S bulldozer and # 46 hydr. control. Reconditioned—30 day guarantee.
Certified buy $16,500

H. O. PENN MACHINERY CO., INC.
140th St. & East River — New York 54, N. Y.
Phone: CYpress 2-4800

Unit H-EQ-1 Hydrohoe; 18" wrist action type bucket, mechanical ejector—less hoist rams; side cutters to cut 24"; Unit 74 HD 3¼" digging ram. New. Removed from H-3 S.N. 111324 6/16/54. Price $2,100, f.o.b. Buffalo, N. Y.
Write: Dow & Company, Inc., Attn.: Burton C. Dow, 1820 Elmwood Ave., Buffalo, N. Y.

Used 22-B Bucyrus-Erie dragline—reconditioned. Excellent condition.
F.o.b. Dallas $12,500

Used Northwest 25 shovel—condition excellent—F.o.b. New York $25,000

Used Unit ¾-yd. rubber tired crane—excellent condition. F.o.b. New York $12,500

Used D-8 tractor with dozer—reconditioned. Good condition. F.o.b. Dallas $12,500

Used Cat 12 motor grader—reconditioned—excellent shape. F.o.b. Dallas $10,500

Used TD-24 with dozer—reconditioned. Excellent condition. F.o.b. Dallas $15,500

Used TD-24 with dozer—good condition. F.o.b. Dallas $14,000

Used TD-18 hydraulic dozer—reconditioned—Excellent cond. F.o.b. Dallas $11,000

Used TD-14 hydraulic dozer—reconditioned—Excellent cond. F.o.b. Dallas $8,000

Used HD-20 with dozer—reconditioned—excellent cond. F.o.b. Dallas $12,000

1 Used Euclid rear dump—91 FD—Excellent cond. F.o.b. New York ..... $15,000 ea.

Call—Wire—Write
BROWNING-FERRIS MACHINERY CO.
305 Exposition Ave. — Phone: TA3-8121
Dallas, Texas

MISCELLANEOUS EQUIPMENT

4—Buda model K-428—6 cylinder 4⅛" x 4¼" gasoline engines with accessories. Special reduced price: $550 each, f.o.b. Guelph, Ontario, Canada.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.

FORD MODEL JD-1025 GASOLINE ENGINE with radiator-flywheel, ring gear and starter, $200.

*ALL PRICES—
F.O.B. SOUTH MILWAUKEE, WISCONSIN
BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.

MISCELLANEOUS EQUIPMENT

ONE—2¼ YD. COAL LOADING DIPPER, NEW FOR 38-B. LOCATED NEAR PITTSBURGH. $2500.
BOX 3720

1 International diesel crawler tractor, model TD-18 (182 series) serial #37722, equipped with Drott skid loader model 18K3 and 3 cu. yd. double bottom bucket with replaceable tip digging teeth; this was a new machine that has been out on rental and has only worked 924 hours.
Price: $26,750 .....Class "A" Warranty
1—International model TD-14 (142 series) diesel crawler tractor, serial #44736, equipped with model 14K3 Drott skid loader and pulpwood rack; this was a new machine that has been out on rental and only worked 647 hours.
Price: $21,500 .....Class "A" Warranty
1—Hough model HH Payloader, serial #18B1561 powered with Hercules gasoline motor, serial #1773795TC, complete with Campbell detachable cab, model 361-HH-195, serial #11337 with windshield wiper, heater and defroster and new 84" bucket with 10 teeth installed; like new, used only 750 hours.
Price: $16,250 .....Class "A" Warranty

TWIN CITY INDUSTRIAL EQUIPMENT LTD.
P. O. Box 810 — 915 Memorial Ave.
Port Arthur, Ontario, Canada

Model 42-T, International diesel powered, crawler mounted, complete with drilling and fishing tools for 9" holes. Good condition.
Price $5,000

Albert Meckes
Gilbert, Pennsylvania
Phone: OVerbrook 12663
Gilbert, Pa. (near Stroudsburg, Pa.)

Model 27-T blast hole drill, serial No. 18269, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3718

Model 27-T blast hole drill, serial No. 19628, Waukesha gasoline power, crawler-mounted, 33' one-piece all-steel derrick complete with tools in good working order. Located in Missouri. Priced to sell. Box 3719

FOR SALE

EUCLID TRUCKS—Rear, bottom dumps and scrapers.
SHOVELS, DRAGLINES—All sizes, makes. Crawler and walking type; diesel and electric power.
120-B BUCYRUS-ERIE electric shovel, 6-yd.
WELL DRILLS—Rotary and churn type.
TRUCK CRANES. CRAWLER CRANES.
DOZERS—FRONT END LOADERS and graders.
CATERPILLAR MOTOR SCRAPERS—DW21.
"Other equipment available not listed above."

WILLIAM LUBBRECHT, III
Construction Equipment
311 W. Diamond Ave. — Hazleton, Pa.
GLadstone 5-4041 — 5-0253

RENT STEEL SHEET PILING
Get the exact lengths and sections you need of all standard sections, delivered *on time*—and at Foster's usual low rental rates.
H BEARING PILE
PIPE FOR PILING
LIGHT-WEIGHT STEEL PILING
PILE HAMMERS & EXTRACTORS
L.B. FOSTER CO
PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

MISCELLANEOUS EQUIPMENT

H-3 clamshell bucket, excellent condition; originally purchased for Hydrocrane 115415, 1956. Price: $750 f.o.b., Salt Lake City.
H-3 clamshell bucket, like new. Price $800 f.o.b. Salt Lake City.
H-3 18' telescopic boom with carrier, tagline and weighted hook; perfect condition.
Price: $1,500 f.o.b., Salt Lake City.
Above H-3 items originally purchased for Hydrocrane 112247, December, 1954.

LANG CONSTRUCTION EQUIPMENT CO.
P. O. Box 1646
Salt Lake City, Utah

BUSINESS FOR SALE

TRUCKING
EXCAVATING SERVICE

Large Illinois city. Excellent common carrier permit. A-1 equipped. Established 29 years; illness. Reasonable. REO, 6 W. 10th, Kansas City, Mo.

POSITION WANTED

Experienced bulldozer, high lift, pan, and turnpull operator. Can do repair work. Age 34. Will go anywhere. Have worked in Central America. James Dick, P. O. Box 8, Hurricane, W. Va. Phone: 3473.

If you are Buying or Selling Used Equipment, this is the place to let the Excavating Industry know about it.

Notes from the Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has formed Allis-Chalmers International as a major operating division. P. F. Bauer was appointed managing director of the new division. He formerly was general manager of the Industrial Equipment Div. Floyd J. Mischke and Paul Dietz, former export managers of the Tractor and Industries groups, respectively, have been named associate directors of Allis-Chalmers International. The new division will be responsible for all manufacturing, engineering and sales operations and activities outside of the United States and Canada.

Bucyrus-Erie Co., South Milwaukee, Wis., has elected Robert G. Allen executive vice president. He reports to W. L. Litle, president. Allen joined the firm in July 1957, as a vice president. In August, he was appointed executive assistant to the president and placed in charge of all manufacturing operations. Before coming to Bucyrus-Erie, Allen had been president of the Pesco Products and Wooster divisions of the Borg-Warner Corp. at Bedford and Wooster, Ohio.

Cummins Engine Co., Inc., Columbus, Ind., has named C. J. Wilhite manager of field service. Wilhite has been with Cummins since 1939 and was assistant sales manager prior to his new appointment. He also has served as northwest regional manager. He will be responsible for coordinating the activities of area service managers and the export and manufacturer service managers.

Ellicott Machine Corp., Baltimore, Md., has acquired the floating dredge business of the American Steel Dredge Div. of the American Hoist & Derrick Co., Fort Wayne, Ind. Under the agreement, all manufacturing rights, patents, drawings, engineering data and patterns of the American Steel Dredge Div. for the design, manufacture and sale of dredges and dredging equipment become the property of Ellicott. Ellicott is prepared to supply repair and replacement parts for all dredges built by American Steel Dredge.

Harnischfeger Corp., Construction and Mining Div., Milwaukee, Wis., has promoted five members of its sales staff. F. J. Hirner, district manager of the Chicago (Ill.) office since 1954 was appointed sales manager of electric excavators. Succeeding Hirner is W. N. Ryan who since 1955, was an excavator salesman in the Chicago territory. Others promoted were G. T. Raubach, to assistant district sales manager, Chicago office; R. B. Maxson, to district manager at Buffalo, N. Y.; and C. R. Morgan, to sales manager of soil stabilizers and Sierra loaders.

LeTourneau-Westinghouse Co., Peoria, Ill., has named four men to sales positions. C. L. Bolton and C. I. Petersen have assumed posts in the domestic sales division as sales assistants. R. D. Paustian and E. H. Russ were given sales jobs in the wire rope division. Bolton will work in the central sales area; Petersen, western area; Paustian, central and northeastern area; and Russ, southeastern area. N. J. (Norm) Richart, formerly southeastern area wire rope sales representative, has been transferred to the equipment sales department as an assistant district representative. He will work with the company's distributor organizations throughout eight southeastern states.

Manitowoc Engineering Corp., Manitowoc, Wis., has appointed Carrier Engineering Co., Fort Lauderdale, as distributor in southern Florida. Carrier will handle the complete line of cranes, shovels, draglines, mobile cranes and backhoes.

John A. Roebling's Sons Corp., Trenton, N. J., has named E. George Hartmann sales vice president. Prior to his appointment, Hartmann was general product manager of the wire and cold rolled products division. He has had over 37 years experience in the wire industry.

"OUR EIMCO 105 'LOADER-CARRIER-CRANE-EXCAVATOR-DOZER' SURE SAVED TIME AND COSTS ON THIS JOB"

. . . Says Coast Contractors' President, Frank McHugh

TACOMA, WASH. - Debris loosened by flash floods clogged culvert drainage and 100 feet of county roadbed were washed out. Contracted to handle the "rush" repair job, COAST CONTRACTORS INC. moved their Eimco 105 Front-End Loader on the site. The versatile Eimco cleared debris; dug and dozed its own access way to the bottom of the gully; trenched and graded a new culvert; transported and positioned 48" concrete piping, and (above) rebuilds the roadway.

NOW IT'S A CRANE! Coast Contractor's work crew comes up with a cable hitch attachment that converts the Eimco 105 into a crane for positioning pipe. NOTE: Loader's tough construction, high reach . . . operator visibility . . . tractor stability (with weight on slope side).

"Equipment has to be flexible to fit into our scheme . . . and our Eimco 105 has proven — IT FITS!"

The object of **Frank McHugh's** praise — an Eimco 105 Front-End Loader — "subbed" for many specialized machines in the speedy completion of a road repair job.

As president of Coast Contractors Inc., Frank's big problem is the same as that facing most every general contractor - builder: Getting a variety of odd jobs done fast without having profit "chewed up" by special equipment investments, labor and maintenance costs.

The Eimco 105 is a "hell-for-stout" earthmover with 40,000 lbs. breakout power to handle "tough" jobs normally performed by specialized big equipment. Yet, it is faster and outmaneuvers tractors half its size.

Hydraulic boom and bucket cylinders respond quickly and simultaneously to lever control. The loader assembly is capable of 15,000 lb. lifts and 14 ft. discharge. Two final drives provide independent track reversal for quick, sharp turns or any operation requiring extreme maneuverability.

The Front-End Loader's overhead loading companion (Eimco 105 Excavator) provides discharge without turning plus these features.

Get the facts on both of these versatile machines before you buy!

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Pittsburgh, Pa. Seattle, Wash.
Cleveland, Ohio Houston, Tex. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B 308

The sign of the safest buy in used equipment

Only your Caterpillar Dealer offers "Bonded Buy." It's protection up to $10,000 when you buy a used Caterpillar-built machine. Here's how it works.

When you make a "Bonded Buy" purchase from your Caterpillar Dealer on any used Cat-built machine, he gives you his Guarantee Bond of up to $10,000, assuring you of satisfactory performance of all parts for a period of 30-90 days. His bond is backed by a master bond issued by Lumbermens Mutual Casualty Co. Its assurance is effective anywhere in the U. S. and Canada.

Other kinds of protection, too

Covering units of any make, in good condition, your Caterpillar Dealer offers you a "Certified Buy." This type of protection includes the dealer's written guarantee of satisfactory performance.

"Buy and Try" is a third form of protection. It carries a written "money-back" agreement.

COMPLETE protection

You know what you're getting when you buy used equipment from your Caterpillar Dealer. Visit his Used Equipment Headquarters for the *safest buys* on the market.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUY IN NEW AND USED EQUIPMENT